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Chicago, August 23, 1924 FOUNDED 1902 Volume XXVII, No. 17

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Rock Products

Volume XXVII | Chicago, August 23, 1924 | Number 17

Digging 7000 Tons of Sand Daily with a Diesel-Electric Elevator Dredge*

The Iron City Sand and Gravel Company's Dredge "Elizabeth Pfeil" Is One of the Largest Sand and Gravel Excavators of Its Type in the World

[In view of the increasing interest in Diesel oil engines as prime movers, and in connection with a series of articles on sand and gravel production in the Pittsburgh district by Editor Edmund Shaw, we reproduce herewith an article on the performance of a quite remarkable dredge. A more detailed description of the construction of this same dredge was published in ROCK PRODUCTS February 10, 1923.]

Side view of the dredge showing the fleet of steel barges that usually surround it. Note the fuel-tank barge

ONE of the most modern and economical dredge of its type in this sand and gravel service is the "Elizabeth Pfeil," owned by the Iron City Sand and Gravel Co., whose main offices are at 801 Bessemer building, Pittsburgh, Penn., and whose yards are scattered all over the city of Pittsburgh.

Designed and built by the Bucyrus Co., the "Elizabeth Pfeil" was launched on June 22, 1922, from the docks of the Midland Barge Co., which lie just northwest of Pittsburgh on the Ohio river. This dredge was specially designed to reclaim sand and gravel from the Ohio and Allegheny rivers in that vicinity where the Iron City Sand and Gravel Co. carry on extensively the marketing of this product throughout Pittsburgh and its surrounding territory.

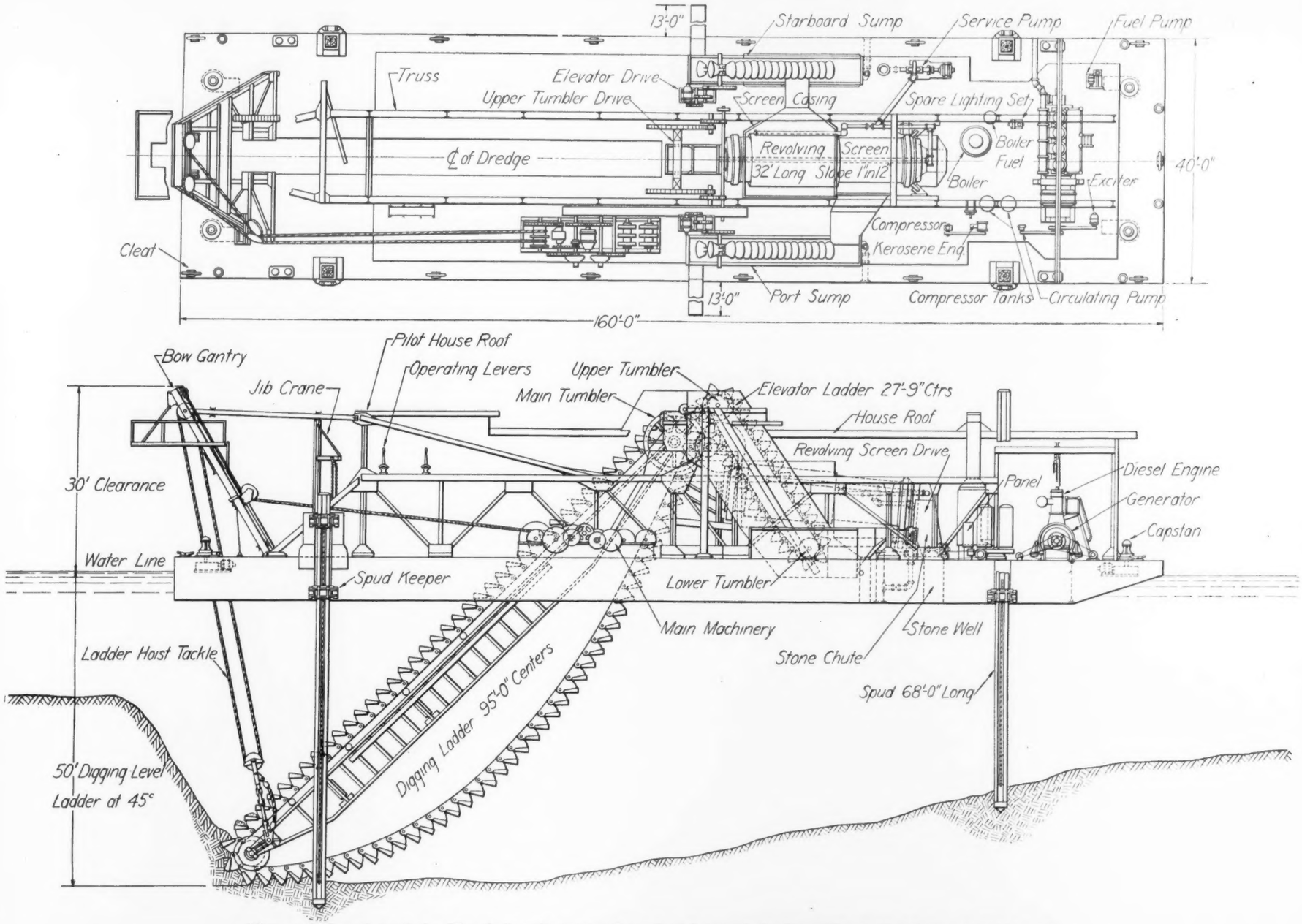
Description of Dredge

The dredge weighing 900 tons, with a capacity of excavating 180,000 tons of material a month, is of the elevator or ladder type, its most unusual feature being its Diesel-electric power unit. The reason for adopting this type of unit is a practical one, since the "Elizabeth Pfeil" was meant for service in the water regions of the Pittsburgh district, where the impurities discharged from the various steel mills have given the water an undesirable constituent for boiler feed on steam craft.

In order, therefore to eliminate any possibility of boiler trouble, the steam unit was abandoned in favor of the Diesel. Another reason lies in the fact that the Diesel-electric power unit can operate much more economically than steam.

With the expiration of foreign patents on the Diesel engine, enormous strides have been made in the development of this type of unit. The Diesel engine has

*Reprinted, with some corrections and changes, from the May issue of the "Excavating Engineer."



Plan and elevation of the Diesel-electric powered sand and gravel dredge "Elizabeth Pfeil" of Pittsburgh

established itself permanently as a means of power where water supply is uncertain or undesirable, and where conditions for bringing the oil to the machine are favorable.

The Diesel unit is a 300-hp., four-cylinder, two-cycle, solid injection, oil burning engine manufactured by the Worthington Pump and Machinery Corp., and is direct-connected to a 270 k.v.a., Westinghouse, 60-cycle, three-phase, 440 volt generator which drives the machinery of the dredge.

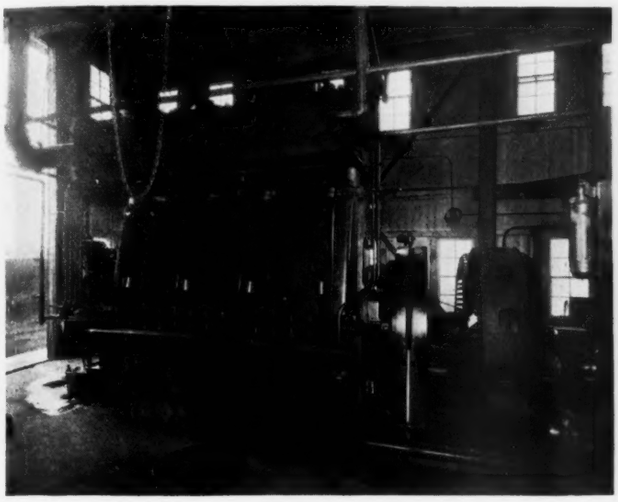
Description of Digging Mechanism

The digging end of the dredge consists of an endless chain of close-connected 8 cu. ft. buckets mounted on a structural steel digging ladder 95 ft. in length, which may be suspended at an angle of 45 deg. for a maximum digging depth of 50 ft. The buckets weighing 1500 lb. each are of nickel chrome steel castings with manganese steel lips. The complete weight of the ladder with its chain of buckets and tumblers is approximately 225,000 lb.

The Operation

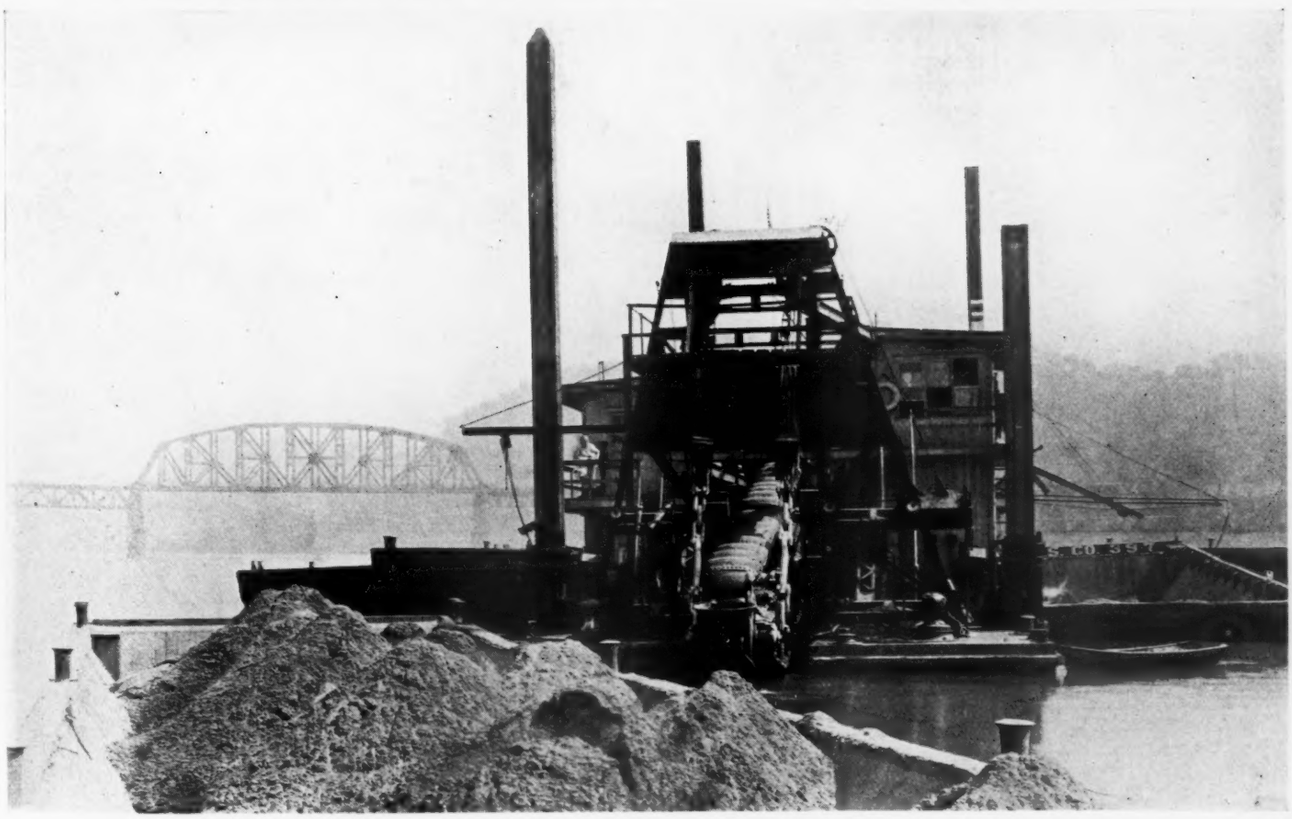
At the time this was written the "Elizabeth Pfeil" was operating near Brunot's Island, northwest of Pittsburgh on the Ohio river, just below the Pennsylvania railroad connecting bridge. It is said to be digging in a location where no other dredge has been able to work, owing to the extreme depth of the material and speed of the current at that point.

The material is delivered by the buckets through a hopper into a revolving screen which is 7 ft. in diameter by 32 ft. long over all. Here the large size gravel is separated from the rest of the material which passes on to the finer screens. The sand screen is about 8½ ft. in diameter and 16 ft. long and surrounds the revolving screen at its upper end.



The 300-hp. Diesel electric power plant

A peek into the dining room



View of the front of the dredge with steel barges in foreground

Plan and elevation of the Diesel-electric powered sand and gravel dredge "Elizabeth Pfeil" of Pittsburgh

Bill Welch, who superintended the erection of the dredge

The sand and various grades of gravel which are being saved are conducted by chutes to sumps in either side of the hull immediately abreast of the revolving screen, the sand going to one side and the gravel to the opposite side. From these sumps it is carried by secondary elevators to a height sufficient to discharge by gravity into the scows alongside.

Economy of Operation

Oil is brought to the dredge in a 15,000-gal. tank mounted on a special barge kept in tow. From this tank the oil is pumped to a 7000-gal. tank located directly under the engine. The oil is then fed from the smaller tank to the engine by its own pump.

At the time this is written, 16 to 18 gal. of Pennsylvania fuel oil are being consumed per hour by the Diesel engine.

Auxiliary Equipment

For use in hauling the material away from the dredge there are in operation 20 all-steel barges costing $10,000 each with a capacity of 700 tons each, built by the Jones & Laughlin Steel Co. Ten of these barges are of the deck type, while the others are of the hopper type.

The material is hauled to the Iron City Sand and Gravel Co.'s various yards in Pittsburgh. One of these yards is at 22nd street, south of the Monongahela river; another is at Fifth street on the Allegheny river; another at 30th street on the Allegheny river, and another at Renouff beach.

At the present time the demand seems to rest upon sand intensely, and for this reason all grades of the gravel are being rejected, the sand alone being distributed throughout the city and its vicinity with a fleet of 50 White trucks and 30 teams.

The material is sold in various sizes, the sand in one size, the gravel in three sizes, including the pea gravel or ¾-in., the street gravel 1¼-in. and the No. 3, which is 1¾-in.

Personnel

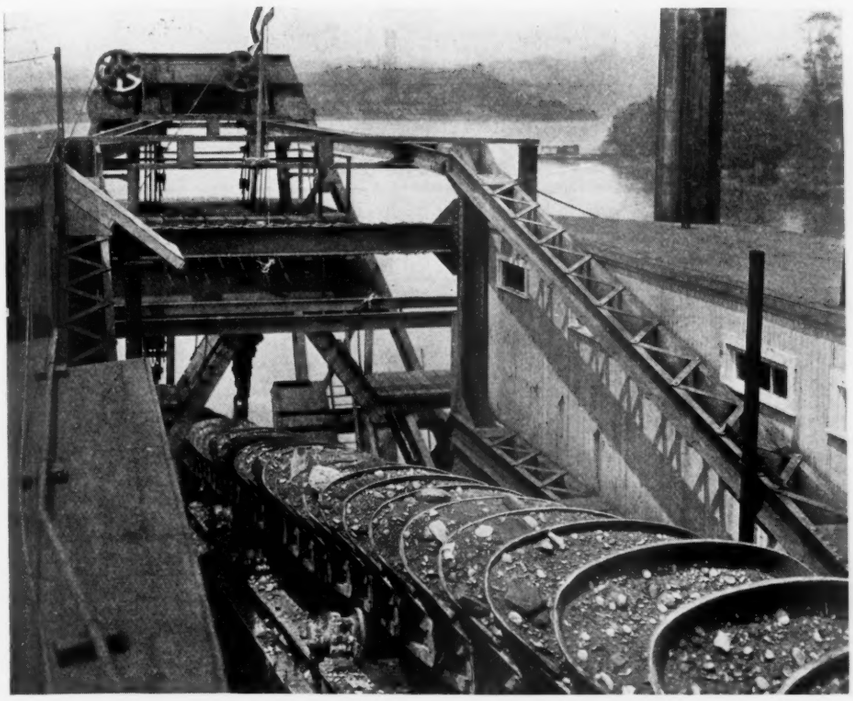
The dredge was erected under the direct supervision of William Welch, an erecting engineer of the Bucyrus Co. In conjunction with Capt. Thomas Hudson, who is still in command, the construction and erection of the "Elizabeth Pfeil" has resulted in the successful and economical operation of one of the greatest dredges in the sand and gravel service. In regard to the performance of the "Elizabeth Pfeil," Jos. A. E. Hoeveler, vice-president and general manager of the company, writes:

"The dredge has given satisfaction and is a distinct success. From both an economic and practical standpoint, its advantages, with respect to output as compared with other types of dredges in use in this district, have been amply demonstrated to be superior. It has proved satisfactory in maintaining the supply of material to meet the demands of our customers."

A Sand and Gravel Dredge with a Chambermaid!

The entire personnel of the dredge consists of 11 men, of whom there are a captain, an operator, a chief engineer and his assistant, an oiler, an elevator operator, four deck hands, a cook and a chambermaid. The officers of the Iron City Sand and Gravel Co. are: George Vang, president; Thos. B. Finan, vice-president; Jos. A. E. Hoeveler, vice-president and general manager; D. C. Elphinstone, vice-president and treasurer, and J. C. Shriver, secretary.

The digging end of the dredge. Note the boulders in the buckets and the inside-outside type lip



A view of the digging end taken from the top, showing how the buckets hold the material, even with the ladder in a high position

Oil-Engine Dredge of Tennessee-Arkansas Gravel Company

Type of Equipment Becoming Popular on Southern Rivers

THE pumping plant of the new Tennessee-Arkansas Gravel Co. consists of one 15-in. sand and gravel pump, manufactured by W. C. Ellis & Son, Memphis, Tenn., which is direct-connected by means of a friction cut-off coupling to 180-hp. four-cylinder Type "K" Anderson oil engine operating at 257 r.p.m. All auxiliary units such as suction hoists, anchor hoists, anchor cable drums, etc., are also operated by this engine by means of pulley and line shaft.

Under normal operation, the pump is delivering 200 cu. yd. of sand and gravel per hour, being mostly ballast material, and the overrun of sand is returned to the river. The pump carries a vacuum of 28 lb., using 50 ft. of suction pipe, 20 ft. of discharge pipe, pumping against a total head of 30 ft.

This pumping plant is located 7½ miles down the Mississippi river from Arkansas City, and the sand and gravel is pumped into barges of 200 cu. yd. capacity each. A tug boat draws the loaded barges to Arkansas City, where an unloading derrick and cableway hoists the gravel from the barges to the storage bins on the top of the levee, a distance of about 200 yd., an elevation of 60 ft. The storage bins are located directly over three tracks of the Missouri-Pacific railway, where the gravel is dropped from the hoppers into the cars for transportation. At the present time they are loading 1200 cu. yd. daily.

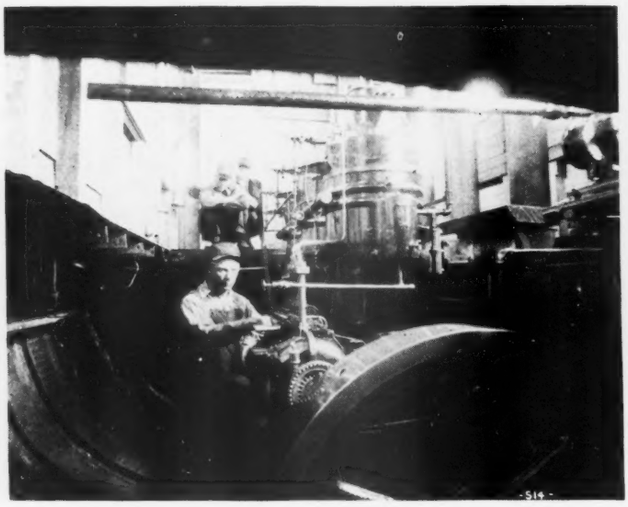
The tug "Virginia" is equipped with a 165 hp. three-cylinder Anderson oil engine turning up a 46-in. propeller of 260 r.p.m., which gives the following towing speed on the river; with two loaded barges of 200 yd. capacity each, the trip is made up the river against the current in 2¼ to 2½ hours; the return trip with two empty barges is made in 45 minutes, making three round trips per day.

In regard to the economy of operation in this plant equipped with oil engines, C. C. Hawkins, president, who is actively in charge of operation, makes the statement that it costs him no more to operate these oil engines than the previous cost in wages for coal passers, the fuel oil on both engines amounting to about $8 per day.

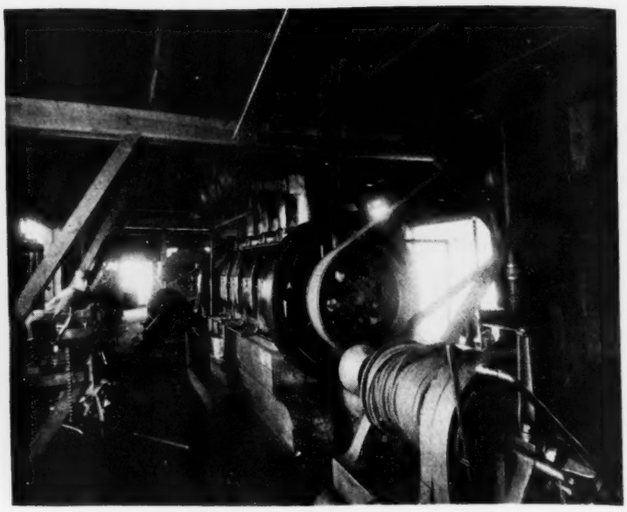
Storage tanks for fuel oil are located on the bank of the river at the unloading plant, and from there piped to the fuel tank on the tug. On one of the barges there is a large storage tank which carries fuel oil to the pump barge down the rive. This is unloaded into the barge fuel tank by means of air prssure, which is part of the equipment of the oil engine at about 15 lb. pressure, which forces the oil from the barge tank to the fuel tank on the pump dredge.

A news dispatch from the Little Rock, Ark., *Democrat*, dated July 28, states: "Fire destroyed the Tennessee-Arkansas Gravel Co.'s derrick boat and tugboat *Virginia* near the company's plant here at 4 o'clock this

Tugboat "Virginia" of the Tennessee-Arkansas Gravel Co.



Hull and engine-room of the "Virginia"—The boat was subsequently damaged by fire



Engine-room of the sand and gravel dredge—A 180-hp. oil engine drives 15-in. pump and hoists

Sand and gravel dredge of the Tennessee-Arkansas Gravel Co. working in the Mississippi river below Arkansas City—the barges are 200 cu. yd. capacity each

morning, with a loss of about $50,000.

"C. C. Hawkins, president of the company, stated other boats would be procured and operations would be resumed for the filling of orders for sand and gravel."

The editors are subsequently informed that the "Virginia" had a steel hull, which was undamaged, and will be completely re-equipped with a 180-hp. 4-cyclinder type K Anderson oil engine to replace the 165 hp. engine noted above. Experience proved the advisability of a more powerful engine.

Silver Springs (N. Y.) Sand and Gravel Company Begins Operations

CONSTRUCTION of the plant of the Silver Springs Sand and Gravel Co., has been completed under the personal direction of G. O. Spaulding and is now in operation. The company has $150,000 capital stock. W. M. Creveling of Mt. Morris is president, G. O. Spaulding is vice-president and general manager, and W. M. Spaulding is secretary and treasurer.

The company was organized for the purpose of developing the immense banks of sand and gravel on the property known as the Monroe Austin farm at Silver Springs. The plant is equipped with the latest modern machinery, and has a capacity of 20 carloads per day. The plant is operated by electricity. The water supply comes from the old Duncan water supply system.—*Ferry (N. Y.) Record.*

American Gypsum Company's New Wall Board Plant

Remarkable Progress in an Industry of Very Recent Origin

By D. W. Griswold,* E.E.
Professor of Electrical Engineering, University Santa Clara, Santa Clara, Calif.

ON July 2, 90 days after construction started, the American Gypsum Co.'s new wall-board plant at Port Clinton, Ohio, produced its first board. Several minor changes suggested themselves at once, but the start was smooth and far better than was hoped for, considering the size of the plant and speed with which it was built.

The Building Is Gypsum Tile

The building, housing the machine and dryer, is 34 ft. 7 in. wide by 680 ft. long, running almost due north and south. It has a structural steel frame work with "Anchor Brand" gypsum partition block roof and walls; consequently it is a fireproof structure. The only burnable part of the building is its wooden window sash.

Adjoining the main building on the east is a wing which houses the bins. This building is approximately 11x40 ft. The main bin has a capacity of 175 tons, and is subdivided into two sections. In addition, there is a hopper, or feed bin, of 11 tons capacity.

Stucco Supply and Mixer

Most readers of Rock Products are familiar with the method of mining gypsum and the manufacture of stucco, so this part of the operation will not be gone into here.

The stucco mill, adjoining the board plant, supplies stucco to the board plant either directly from its screen room or from any one of the several storage bins. The stucco is conveyed by a screw conveyor mounted about 30 ft. above the tracks. Part of the stucco goes to the block plant and part to the board machine. In the wall board plant the conveyor runs about one-half the length of the building just under the roof. It then turns and the stucco goes either into the main bin or the feed bin, as desired. From the main bin the stucco is handled by a conveyor and elevator to the feed bin.

From the feed bin it passes into a hopper just over a belt conveyer. At the bottom of this hopper a roll is closely fitted and against the roll an apron is set at the desired distance above the belt. This arrangement insures an absolutely uniform flow of stucco on the belt and prevents flushing in case hot stucco is being received from the mill. After passing the apron a fluted roll helps in giving a still more uniform distribution on the conveyor. Shortly after passing this, the stucco is emptied on the mixing belt. Here the necessary ingredients and water are added. The mixing belt is provided with eight agitators, which are sufficient to insure a uniform mix. Each one consists of four belt-driven rods, placed so that they are slightly above the mix belt. After the agitators have been passed, the mixture is discharged upon the board machine's feed belt. This belt is reversible and is run backward until the proper mix is obtained; it is then run forward and empties upon the machine.

For the information of those who have never seen a finished piece of plaster wallboard, it is nothing more nor less than a board of plaster, each side of which is covered with heavy paper, neatly folded under at the edges. To manufacture it so that it is of uniform thickness, width and quality is an art in itself. Two rolls of paper feed into the machine, the plaster being fed on one sheet while the other sheet is laid on top of the plaster. All of this, of course, is mechanical.

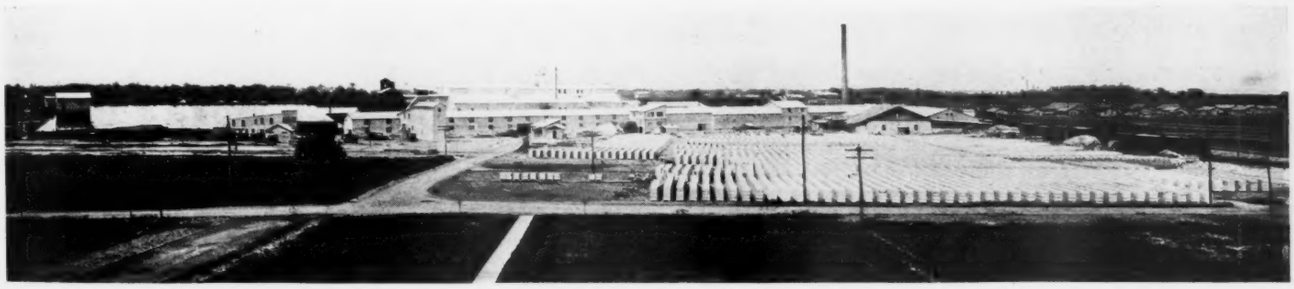
Handling the Paper

At one end of the building will be built a storage house for the paper, which will be of steel and gypsum partition block construction, similar to that of the main building. One end of the storage house is close to a siding so that cars may be spotted where a small electric hoist can pick up the rolls at the car door. The rolls will then be carried into the building by the hoist and distributed to the desired point over any one of seven lines of overhead track. This arrangement is so simple that one man can easily handle the unloading of the paper.

The rolls, which are 53 in. wide and 42 in. in diameter, will be stacked three high. Each roll contains approximately one-half mile of paper. The capacity of the storage house is 14 carloads of paper, or about 775 rolls. The paper is carried from storage to the paper rack of the machine by the same hoist that puts it in storage. Here an ingenious arrangement has been provided whereby the paper is put in place by one man. He passes the new paper over the old and into the folders and after the tension is correct he pulls a chain arrangement which slides the old roll out and the new one into place without interfering with the process.

The Board Machine

As the paper runs off the rolls its edges are wetted on the inside and it then passes



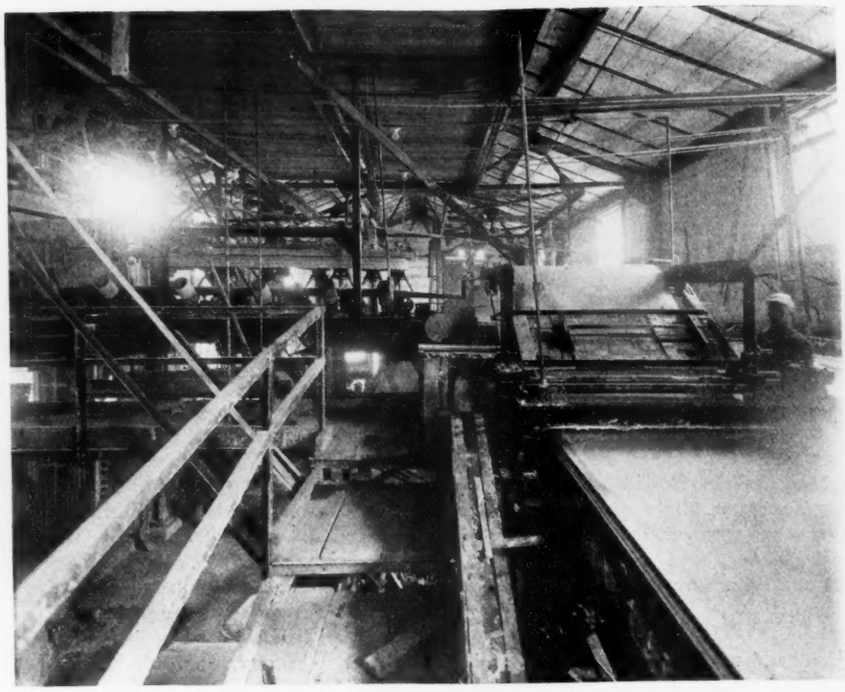
General view of the entire operation of the American Gypsum Co. at Port Clinton, Ohio. Note the neatness of the block storage yard

*Son of E. J. Griswold, vice-president and general manager, American Gypsum Co., Port Clinton, Ohio.

through the folders where it receives a fold through 180 deg. At this point the paper has reached the feed belt and the stucco is emptied upon it. An oscillating arm moves agitators over the width of the paper and spreads the stucco uniformly across the paper and into the folds. Here the top layer of paper comes down on the top of the stucco. After leaving the folders it passes under a roll where the desired thickness is obtained. The folders can be set to make either 32-in. or 48-in. board.

The "green" board then passes along a belt conveyor and under a set of ironing rolls which press it to exact size and smoothness. A few feet beyond the rolls the continuous strip of board comes to the cut-off saw. The plane of the saw is perpendicular to the line of the board but advances at such an angle that it moves forward just as fast as the board, hence cutting the board off squarely and to exact length. The board and saw are both positively driven from the same motor, thus insuring no slippage which would cause a variation in length.

The individual boards, now cut to the desired length, are sent on to another belt which travels at a slightly greater speed. This spaces the board at the desired distance. They are carried by this belt at a speed of about 30 to 40 ft. per minute, depending upon conditions. The belt is of sufficient length that while on it the stucco in the board receives its initial set. The belt discharges the boards on a set of gravity rolls which feed the transfer.

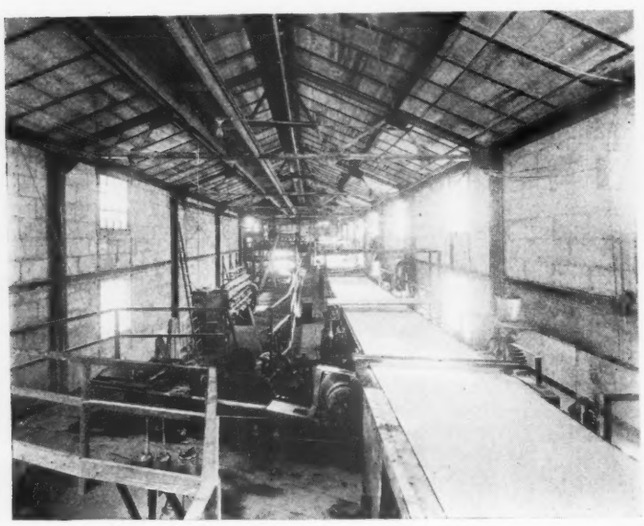


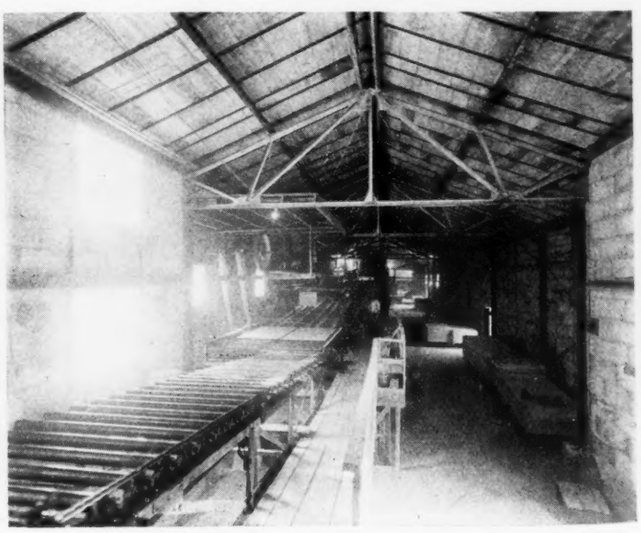
The wall-board machine itself. The conveyor in the left center brings the stucco to the machine. Foreground at the right shows the continuous strip finished, except the cutting

The Transfer and Tipple

These two pieces of equipment were built by the Coe Manufacturing Co., Painesville, Ohio. They serve to place the board two or three abreast, depending on the size of the board, and then put them on any of the six decks of the dryer as desired. The operation is as follows: As a board runs out on the transfer the desired distance, a platform is operated which lifts the board above the driving rolls. The operation of a lever then moves the platform, with the board on it, over the width of one board. By this time another board will have entered the transfer and the operator again raises the platform and a lower step lifts the second board above the driving rolls. The platform then goes over as before, two boards now being lifted above the drive rolls. When the next board comes abreast of the other two, the operator lowers the platform, allowing the boards to come down upon the drive rolls. The three boards abreast are now driven out on the tipple. The principle of the transfer is very satisfactory, as it insures a minimum of abuse and handling. After a little experience the operator rarely need do the board the slightest damage. While a few mechanical defects developed, they are rapidly being corrected. This is not at all surprising, as the design is entirely original.

The tipple is a platform 25 ft. in length, hinged at the transfer. The point of hinging is at the same height as the center of the dryer. The free end is counter-balanced and moves on an arc. Blocks are provided under six decks of the dryer so that the tipple can be stopped, by means of dogs, at



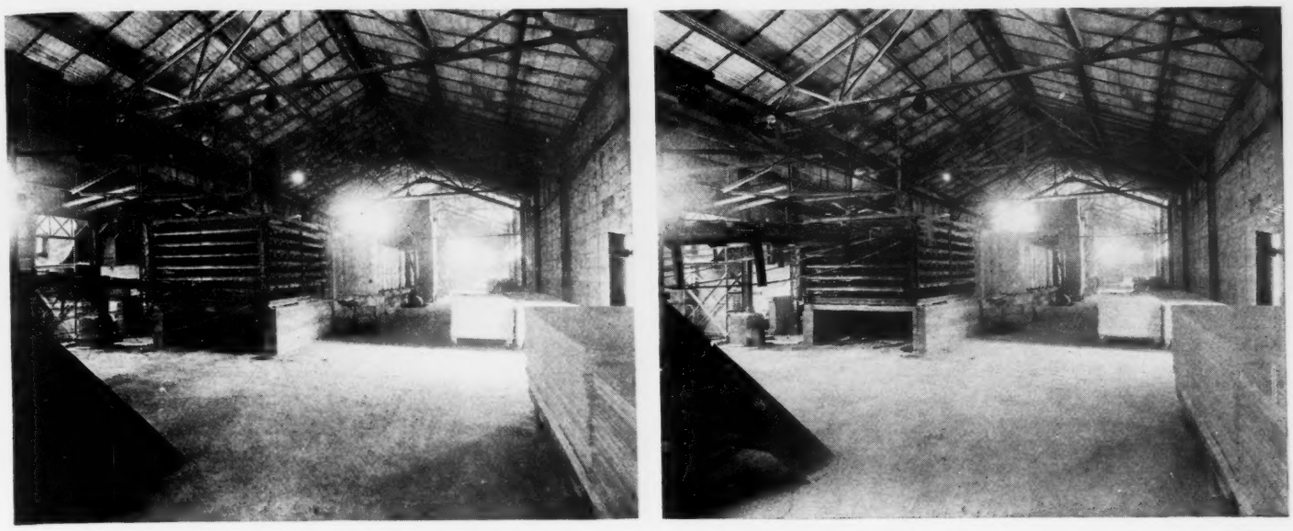


The view at the left was taken from the dryer end showing the continuous strip coming from the machine. In the foreground is the cut-off saw which cuts the board while moving; right, boards on the transfer, about to go into dryer

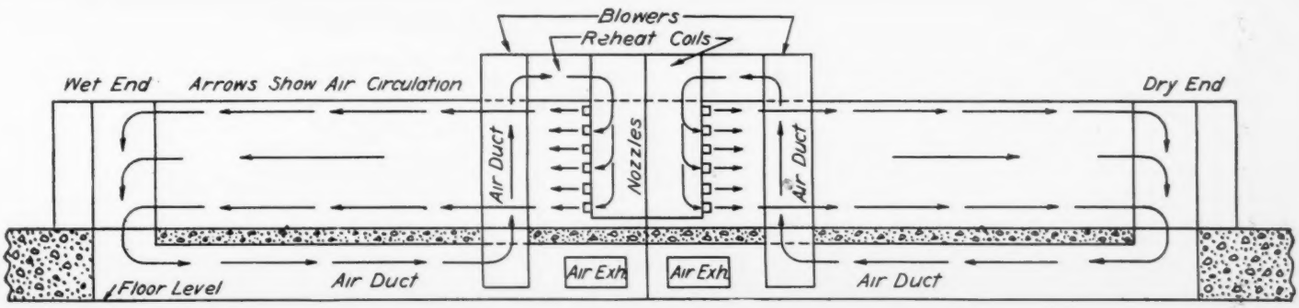
each deck. Six belts drive the boards along the tipple and in on the dryer. Here the first few sets of rolls are ratcheted, allowing the boards to run in at a relatively high speed. The dryer rolls then take them on through the dryer. The operator releases the dogs and the tipple lowers to the next deck and so on until all decks are filled.

The Dryer

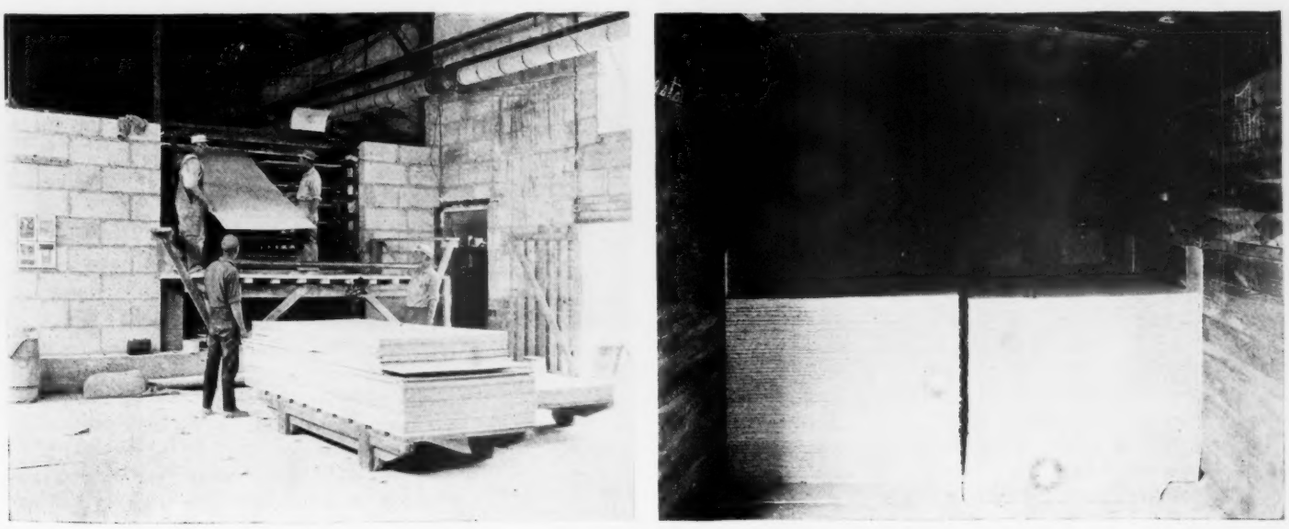
The dryer was also built by the Coe Manufacturing Co. Over all, it is 200 ft. in length, 162 ft. being used for heating and the rest for the approach and cooling sections. As stated above, the dryer consists of six layers, or decks, of rolls. These rolls are chain driven. The rolls are equipped with gudgeons, which mount in specially



These two views show the tipple and head end of dryer. The view at the left shows the tipple depositing boards in the upper rack of the dryer, while the one at the right shows boards being put in the lower rack



This drawing (not to scale) gives a good idea of the air circulation in the dryer



Left, removing the finished bards from the dryer. The method illustrated will be replaced by mechanical equipment in the near future; right, how the wall-board looks in the car. Great care is taken in the loading

developed ball bearings and which operate satisfactorily without oil. The speed of the rolls is controlled by means of a Reeves variable-speed transmission to suit the speed of the board machine and the drying conditions.

The dryer was designed to evaporate 8/10 lb. of water per square foot of board and with this amount of water present to dry 150,000 sq. ft. of board in 24 hours. The design is apparently exceedingly liberal, as the machine has been run at a capacity of 162,748 sq. ft. in 24 hours without any difficulty whatever. When this run was made eight banks of coils were entirely off. No attempt has been made to obtain a higher capacity, but it is believed that the machine is capable of much more than this.

All together there are 30 banks of coils in the dryer of 1¼-in. pipe. Car heater return bends with 2½-in. centers space the pipes. Over five miles of pipe are used in the heating coils alone and it is estimated that 300 boiler horse power will be required to operate the dryer. As soon as possible, a General Electric steam-flow meter will be placed in this line to check the estimate. A 5-in. line furnishes the steam from the power house, which is about 400 ft. away. This line is well lagged to prevent excessive radiation.

The banks of coils are divided into three sections, each operating at a different pressure. Each bank drains into a common return pipe for its section and hence into a tank. This tank is equipped with an S-C regulator and an air relief valve. When the water collects to a predetermined height, the regulator is cooled and the diaphram then is relieved of pressure, allowing the valve in the return line to open. The pressure in the section (160 lb. per square inch) forces the condensate over to the power house, where it is sent back into the boiler or feed water heater as desired. The steam in the tank goes into the next section of coils at a pressure of 158 lb. per square inch. In case the pressure is lower than this a reducing or make-up valve from the main line builds the pressure up to the desired value. In the drain system of this section another regulator is placed. Here the steam is sent on to the third section at 156 lb. pressure, the condensate being returned to the power house as before. In the last section, condensate is returned and the steam passes into a bank of condensing coil. This condenses the remaining steam and induces a greater circulation through the other coils. In case an air-pocket forms in the tank, the air relief valve opens and expells it.

So far as the writer is aware, this is the first wall-board dryer installation on which a complete S-C regulator system, returning condensate to the boilers, has been installed. The system is much more simple than the old trap and involves much less apparatus and, therefore, presents less chance of getting out of order. It also permits higher temperatures in the dryer due to the fact that the pipes are never water bound. These regulators are also used for trapping the main line.

The Air Circulation

Two 50,000 cu. ft. per minute Sturtevant blowers force the air through the nozzles which are placed between the several decks of rolls. The air enters at the center of the dryer, one blower forcing the air towards the wet end, the other towards the dry end. The air passes over the board, then down a return duct back through a passage under the dryer to the blowers. At the center of the dryer a 25,000 cu. ft. per minute fan is used to exhaust the moist air from each end. The amount of air that is recirculated and the amount that is exhausted is readily controlled by means of dampers. Each blower is furnished with a "makeup air" door. In the return duct of each blower is placed four reheat coils that serve to reheat the recirculated air. These coils are also a new departure in wall-board dryer designs. They have been found to be very valuable, especially where a sudden change of temperature is desired for any reason.

The dryer itself. It is 200 ft. long and has a rated capacity for 150,000 sq. ft. of board per 24 hours

Operation of the Dryer

The temperatures used in this dryer are, it is believed, somewhat higher than is the usual practice. On the wet end a recording thermometer is placed and the temperature there maintained practically constant. At the center of the dryer another recording thermometer is placed. This temperature also remains practically constant, regardless of all ordinary changes. On the dry end, the board is very sensitive to temperature change and the temperature must, therefore, be regulated very carefully. Here the speed and size of board has a very material influence on the drying. A few degrees will either burn the board, causing "peelers," or cause it to be damp. In a short time an automatic temperature control device will be installed.

At the present time very few of the 10 banks of coils on the dry end need be used.

In fact, nine of these coils are usually off all together and the valve on one other bank is only partially open. At first, some difficulty was experienced in burning the board when the dryer was only partially full (after a shutdown). The repeat coils and "makeup air" doors, however, provide a solution of this difficulty. After a little experience the operator of the dryer can readily keep the temperature down and save the last boards.

A daily record sheet is kept of all of the variable conditions, the amount of water evaporated per square foot of board, all temperatures, speed, recirculation, etc., thus giving an accurate check on the operation from day to day.

At the time this goes to press, the plant has been in operation about 30 days. In that short length of time, however, the plant as a unit is functioning well, and while occasional changes are still necessary, they are only of minor importance.

The "White Rock Brand" wall-board and "Monarch Brand" plaster board made by the company prior to the fire which destroyed its old plant was well known to the trade and because of the improved method of drying and handling it is expected that the quality, as well as the appearance of the new product, will come up to, and exceed, the quality of the product of the old plant. The company claims that its product is the only reversible board on the market today, this being a desirable feature with the dealer and the building contractor. In addition, the board has four thicknesses of paper on the edges, thus giving it great strength, and it also has a grooved edge which forms a clinch for the crack or joint filler which prevents it from coming out.

The building was so constructed and the machinery so installed that a duplicate unit can be added without any changes in the building or interference with the present operation, thus increasing the output 100%.

The company since its fire has built a new gypsum block plant and has installed an automatic block-making machine, which is producing blocks far superior to those made by the old hand process and requiring a much less number of men to operate. An addition to this building is under construction at present and another automatic machine is to be installed. Upon completion of the plant a detailed description of it will appear in ROCK PRODUCTS.

Talc and Soapstone in 1923

THE Department of the Interior reports that the total quantity and value of talc and soapstone produced and sold in 1923, as reported by producers, was 196,692 short tons, valued at $3,012,253, according to information compiled by the Geolgical Survey in co-operation with the state surveys of Georgia, Maryland, New Jersey, New York, North Carolina and Virginia. These figures represent a decrease from 1922 of 1% in quantity and an increase of 5% in value.

Universal Gypsum Company Floating Bond Issue of $350,000

THE Universal Gypsum Co., Chicago, Ill., is offering through two Chicago bond houses short-term bonds (maturing August 1, 1925 to August 1, 1927) in denominations of $1000, $500 and $100 to the total of $350,000. The price asked is 100 and interest, yielding 7%. Advertisements give the following data about the business and properties of the company:

"The Universal Gypsum Co. is one of the three largest producers and shippers of gypsum products in the United States. In addition to a considerable business in the mining of gypsum rock for use in the manufacture of portland cement and for agricultural purposes, this company manufactures and sells gypsum plaster and finishing plaster, gypsum wall board and plaster board, gypsum partition tile and material for roof decks and floors, etc. The Universal Gypsum Co. is especially well situated to profit from the growth of the industry because of its excellent properties, its low costs of operation and its progressive management under a board of officers and directors, practically all of whom have occupied high positions in the industry for a number of years.

"At Fort Dodge, Iowa, the company owns two mills with a combined capacity of 250,000 tons per annum of finished products. The supply of gypsum rock at this point is conservatively estimated at over 12,000,000 tons. Through a subsidiary, the Universal Gypsum Co. of Texas, the company holds title to 480 acres in Texas containing a deposit ranging from 6 to 14 ft. in thickness and considered the most extensive deposit of pure gypsite, commercially located, in the United States. At this point a modern 100,000-ton plaster mill is operated. At Akron, N. Y., the company's property in addition to a new 100,000-ton plaster mill consists of nearly 2500 acres, examination of which has determined a minimum of 12,000,000 tons of gypsum rock deposit. This deposit and that located at Fort Dodge are held under what in effect is a perpetual lease at such a nominal royalty as to make the lease preferable from a financial standpoint to direct fee ownership. At Batavia, N. Y., and at Fort Dodge, Iowa, it owns and operates gypsum wall-board plants with a combined capacity of 45,000,000 ft. per annum.

"All of the properties of the Universal Gypsum Co., including the mines, are electrically equipped and operated throughout, insuring lowest manufacturing costs.

"The Fort Dodge properties have been known for years as being very profitable and under Universal management showed net earnings for 1923, after all charges including taxes, of $123,475 available for interest, while the net earnings of the Akron properties for nine months were $65,635.68 or at the annual rate of $87,514. These combined earnings are at the rate of nearly 3½ times the interest charges on the company's outstanding funded indebtedness, including this issue. The earnings stated from the Akron mills are entirely from the sale of crushed gypsum rock to cement companies, etc., and do not include any operation of the new plaster mill.

"The earnings of the Akron properties for four years and nine months entirely from the sale of crushed gypsum rock averaged approximately $60,000 after depreciation and taxes but before depletion or about 2½ times the interest charges on this issue, which is a first mortgage lien on the Akron properties. The company reports net earnings for the month of June, 1924, before taxes, of about $35,000. It estimates its net earning for the year to be approximately $325,000, or over five times interest charges on all its bonds.

"Under the provisions of the trust deed securing this issue of first mortgage bonds, the company covenants to deposit with the trustee in monthly installments a sum sufficient to pay the next maturing principal and interest.

"These bonds are specifically secured, in the opinion of counsel, by a closed first mortgage on the land, buildings, leaseholds, machinery and equipment of the properties of the company located at Akron, N. Y., and appraised as of May 31, 1924, by the American Appraisal Co. as having a sound value of $1,704,781.87, or at the rate of $4870 per each $1000 bond issued.

"These bonds are convertible, at the option of the holder, into the preferred and common shares of the company upon the following terms: If presented on or before August 1, 1925, on the basis of $1000 in principal amount of bonds, into 10 shares of the company's preferred stock of $100 par value each and ten shares of its no-par value common stock; if presented on or before August 1, 1926, into 10 shares of its preferred stock and seven and one-half shares of common stock; and if presented on or before August 1, 1927, into 10 shares of preferred stock and five shares of common stock, unless said bonds shall have been called for payment and in that event, the conversion privilege shall extend up to the redemption date. This conversion privilege should add materially to the value of these bonds before maturity."

Mica in 1923

THE MICA INDUSTRY in 1923 showed an increase in the quantity and value of both sheet and scrap mica sold during the year, according to a report from the Department of the Interior, prepared by the Geological Survey. A total of 9,086 short tons, valued at $440,875, was sold.

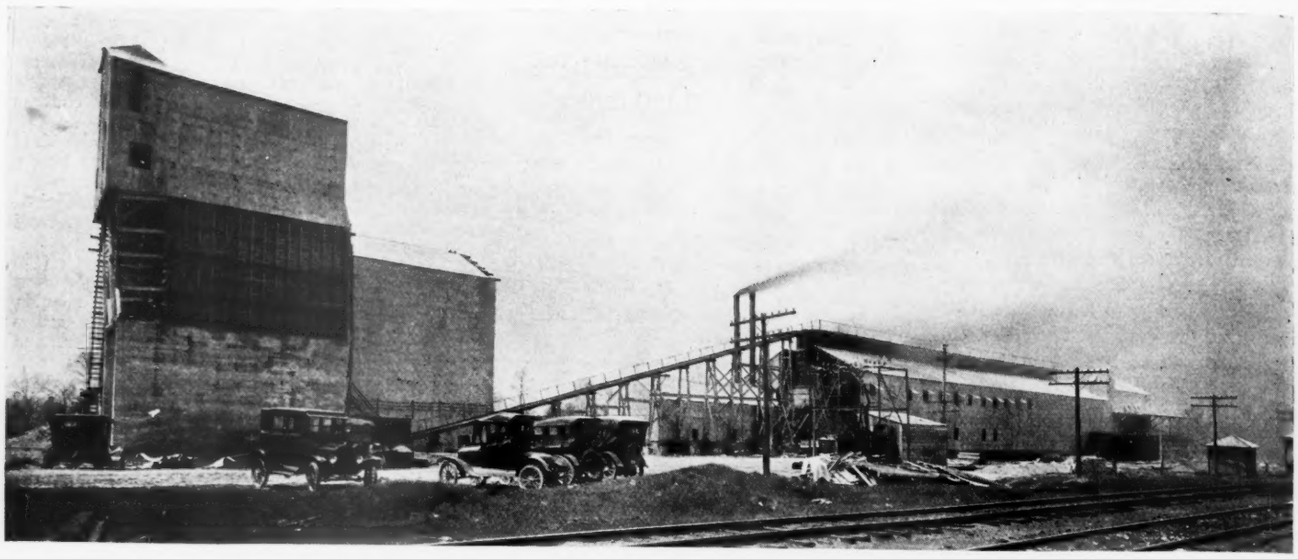
The sales were made in 11 states—North Carolina, New Hampshire, New Mexico, Virginia, South Dakota, Georgia, Wyoming, Colorado, Connecticut, South Carolina, and New York, named in order of total value.

DOMESTIC UNCUT MICA SOLD IN 1922 AND 1923, BY STATES

	—Sheet Mica—		—Scrap Mica—	
	Pounds	Value	Short tons	Value
No. Carolina:				
1922	544,495	$119,767	4 205	$65,923
1923	1,130,283	188,317	5,005	65,764
New Hamp.:				
1922	475,647	63,240	238	5,838
1923	835,751	107,674	1,078	25,871
Other States*:				
1922	57,826	11,294	2 198	42,284
1923	97,145	15,189	1,971	38,060
Total 1922	1,077,968	194,301	6,641	114,045
1923	2,063,179	311,180	8,054	129,695

*"Other States" include in 1922: Alabama, Colorado Connecticut, Georgia, New Mexico, South Carolina, South Dakota, and Virginia. In 1923: Colorado, Connecticut, Georgia, New Mexico, New York, South Carolina, South Dakota, Virginia, and Wyoming.

The prices during 1923 on the whole showed small variation. The prices of the smaller sizes of sheet mica decreased toward the last half of the year, and the prices of the sizes larger than 2x2 in. showed varying increases for the same period. The prices of uncut sheet mica for the first half of 1924 were slightly higher than for the preceding six months and were more stable.



Crushing plant of Wm. L. Urschel Lime and Stone Co., Gibsonburg, Ohio, with a capacity for 2000 tons daily. The plant was completed in the record-breaking time of six months

New Ohio Lime Plant Completed in Record Breaking Time

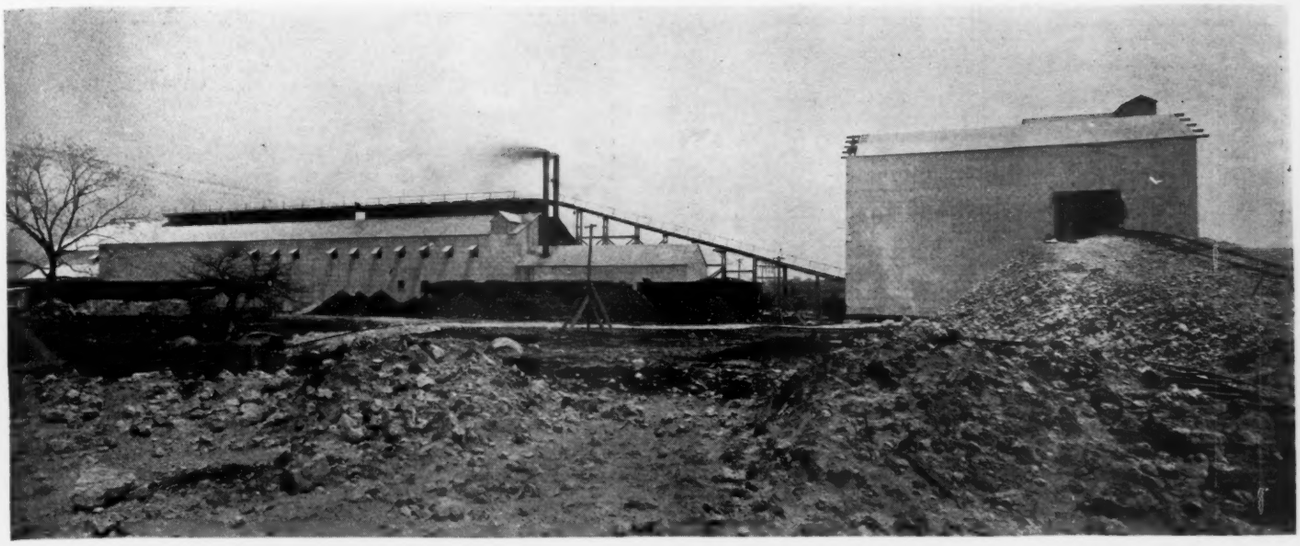
William L. Urschel Lime and Stone Company Hydrate Mill at Gibsonburg Completed in Less Than Six Months—Has a Daily Capacity of 250 Tons of Lime and 2000 Tons of Stone

By Charles A. Breskin

THE PRODUCT "hydrated lime" has no greater exponent than Wm. L. Urschel, who is one of the pioneers of the hydrated finishing lime industry in Ohio. Having been associated actively in lime manufacture for a period of 25 years it was pretty safe to assume that such a man would be rich in experience and ideas and this is more than exemplified in the new plant that Mr. Urschel has built at Gibsonburg, Ohio. In the short space of six months he completed and started the operation of what is one of the largest individual unit lime plants in the industry. In addition to the lime plant he has constructed a stone-crushing plant of 2000 tons daily capacity. This is no mean achievement when one stops to consider that most of the construction went on during the winter months.

The plant as it stands today contains many interesting features—some new to the lime industry. Constructed as it was with great speed it is not so much a job of beauty as one of practicability. Some things are put in temporarily and these will have to be replaced. As time goes on, no doubt, many labor-saving devices will be added. These will be necessary because competition in the finishing lime

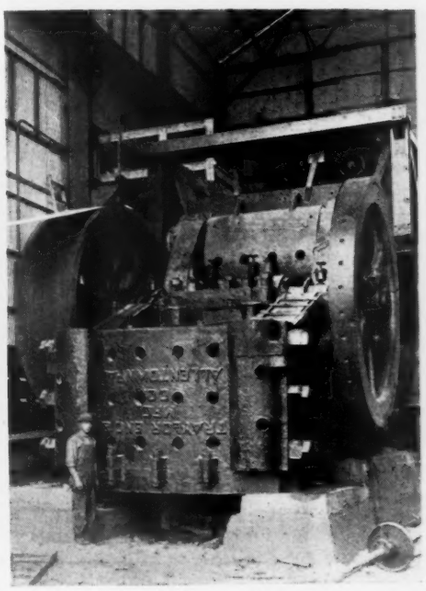
Opening up the quarry. A No. 110C shovel with a 6-yd. dipper does the loading. There is very little stripping but what there is is removed by the smaller shovel. An electric drilling machine is used for blast-holing



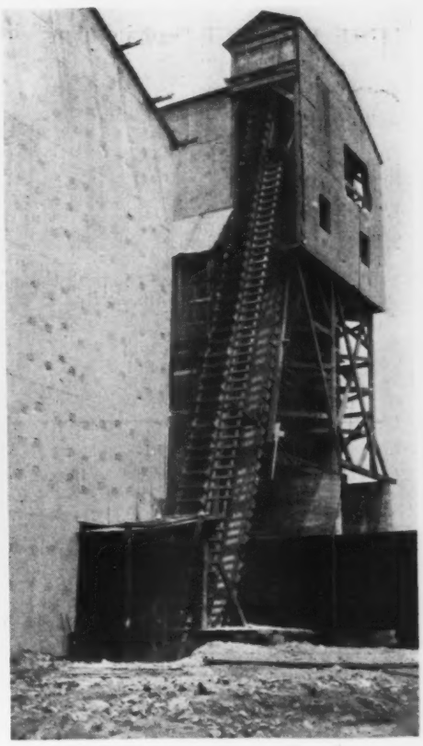
Lime burning and hydrate unit of Wm. L. Urschel plant having capacity for 250 tons daily

Left, the shovel digging into the face of the rock; right, the incline from the quarry entering into the crushing plant

Close-up view of drilling rig for blast-holing



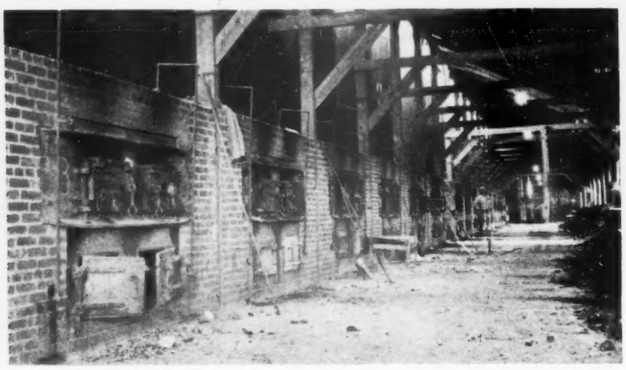
The 66x86-in. jaw crusher is belt-driven from a 350-hp. motor. This crusher is one of the six largest built. Note car overhead ready to discharge into crusher hopper

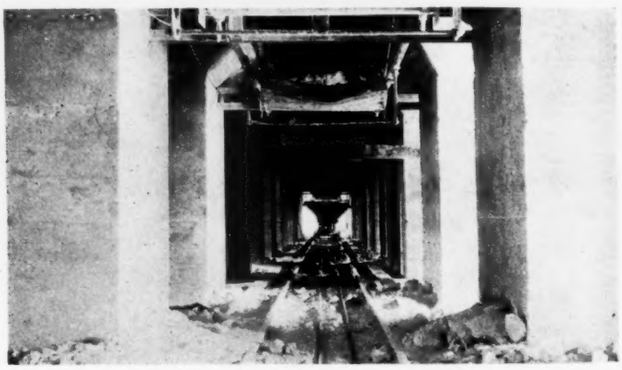


Main bucket elevator, 30 in. wide, 72 ft. centers

Left, 30-in. pan conveyor delivering stone from jaw crusher or disc crusher into main elevator; right, loading stone at the crushing plant. This is for commercial purposes. The tipple at the right is for the kiln stone

Left, loading stone from bin into rocker dump car for kiln burning. This is hoisted up an incline to the kiln hoppers; right, the lime plant in action. It consists of 18 kilns, each having 15 tons capacity





Left, view of the lime burning floor. Each kiln has a furnace on both sides. Live steam is injected under the grates to facilitate burning; right, method of drawing lime. Rocker dump car runs entire length of kilns. Pneumatic draw shears are used

industry is getting keen and costs must be pared to the bone. Nevertheless, after one has visited the plant he cannot help but be impressed with the boldness of the undertaking and the relentless energy that drove it to completion.

Quarry Crushing and Screening Operations

The plant is located just outside of Gibsonburg, Ohio, on a six-hundred acre tract of land. Most of this is a dolomitic limestone deposit, peculiar to this section of Ohio, which burns to an excellent finishing lime. While the plant was under construction the quarry was opened up and when the plant was ready for stone, the stone was available.

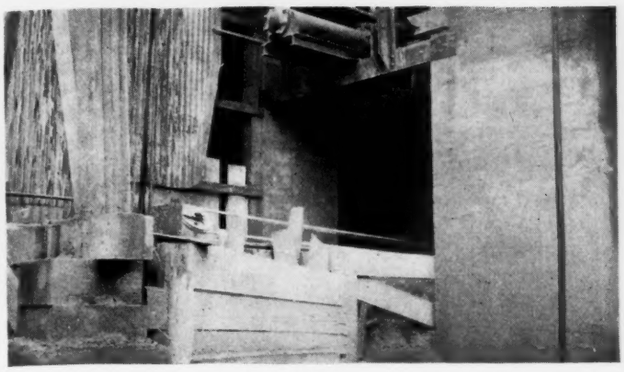
The quarry equipment consists of a No. 110 C Bucyrus steam shovel with a 6-yd. dipper. For blast holing there is a 14 C Sanderson-Cyclone well drill, electrically driven.

A ¾-yd. Marion steam shovel is being utilized for stripping overburden. Stone is loaded into 12-cu. yd., side-dump cars and hauled up an incline to the crusher hopper by an electric hoist. The cars are discharged by a compressed-air operated dumper into the crusher hopper.

The primary crusher, a 66x86-in. Traylor jaw, is one of the interesting features of the plant. It is one of the six largest ever built and is belt driven from a 350-hp. Westinghouse motor. The crusher formerly did duty at the Rockland Lake plant on the Hudson River of the New York Trap Rock Co. Dismantling it, loading on cars and erecting again was a real job.

Over the crusher is a 4-ton Pawling and Harnischfeger electric traveling crane. The jaw crusher discharges on a 30-in. Webster pan conveyor feeding a 30-in. bucket elevator of 72 ft. centers. The buckets on this elevator are made of Armco ingot iron which is non-rusting. As some of the accompanying photographs show there is no housing over the elevator.

The main elevator discharges into a 5x24 ft. rotary screen with a ¾-in. dust jacket and 1-in., 2½-in. and 5-in. perforations, the former two being stone for commercial purposes and the latter stone for



Left, one of the air cylinders required to operate draw shears; right, pan conveyor feeding burned lime to hammer mill

the lime kilns. Stone under ¾-in. goes to a Hum-mer screen which takes out all the dust.

The various products are discharged into bins below the screening apparatus. There are six bins, each holding 60 tons. For recrushing a 36-in. Symons disc crusher is provided. This takes the product from any bin, grinds down to ¾-in. and discharges back into the main elevator.

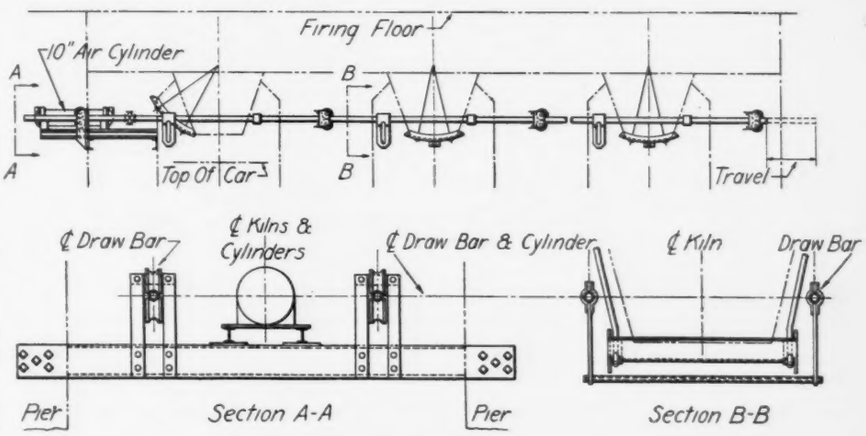
The crushing plant has a capacity of 2000 tons daily and operates independently of the lime plant, although it furnishes all the stone for the lime burning.

Lime Burning and Hydrating

The lime-burning plant is composed of 18 Arnold and Weigel 11- by 32-ft. kilns. These are of the standard type with fireboxes on opposite sides, coal being used as fuel. The kilns are set on concrete piers, as is shown by one of the photographs taken during construction. Provisions have been made for shaking and dumping grates but temporarily, stationary grates have been installed. Steam is injected into the kiln through the fireboxes to facilitate lime burning, as is standard practice in the Ohio dolomite industry. An inclined trestle extends from the crushing plant, where the limekiln stone is stored, over the entire length of the 18 kilns. A two-ton rocker-dump car brings the stone up to the kilns. Coal is delivered to the firing floor by a bucket elevator and distributed to various points along the kilns by wheelbarrows. This method will be supplanted later on by automatic coal-handling machinery.

After the lime is drawn it is discharged into a 2-yd. rocker-dump car which runs on a track underneath the entire length of the 18 kilns. Drawing is accomplished by pneumatic draw shears, operated by two 10-in. Curtis air cylinders.

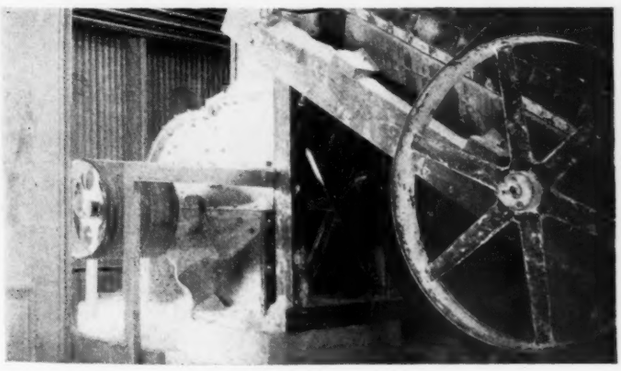
The principle is shown in the accompanying sketch. Each cylinder operates a kiln. Draw bars run the entire length of the kilns on both sides of the shears. When it is desired to draw a kiln a rod is put through the shears and the draw bars on either side and the cylinders opened. This is a quick and efficient method of drawing lime and use that is becoming more popular every day.

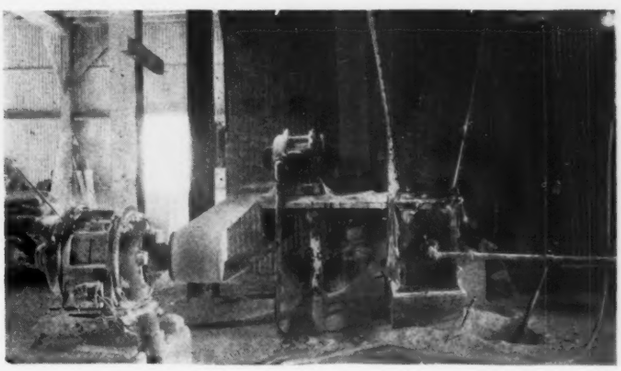


Plan and cross-section of shear operating mechanism. Two 10-in. cylinders are required to operate the 18 kilns

The lime in the rocker dump car is conveyed by hoist to a hopper feeding a 30-in. Webster pan conveyor delivering to a No. 2 Jeffrey hammer mill. This mill is direct connected to a 50-hp. motor.

The lime from the hammer mill is conveyed by bucket elevator to two 60-ton storage tanks set just ahead of the hy-



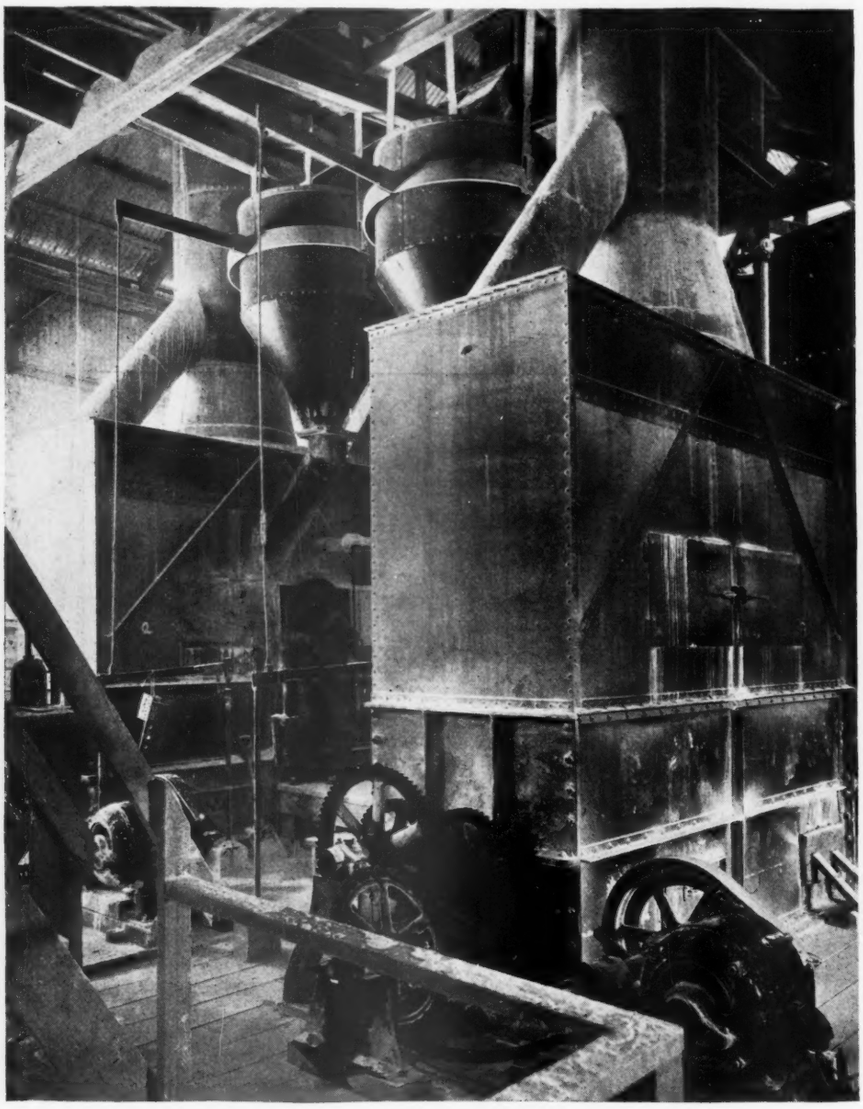


Left, hammer mill used for pulverizing burned lime. From here the lime goes to ground lime tanks; right, one of the grinding mills and motor drive

drators. It is drawn out of these by screw conveyors into bucket elevators which discharge to two Weber batch-type hydrators. The hydrators were invented and patented by Franz Weber who is now general superintendent of this plant. He was formerly superintendent of the Washington Builders' Lime Co. plant at Woodville.

The Weber hydrator has a capacity of one ton of lime per batch. It requires about 58 sq. ft. of floor area and headroom of less than 11 ft. The lime is fed to the machine from a hopper which automatically measures the proper batch. The water is introduced by a sprinkling pipe, the correct proportion between lime and water being determined in advance. The hydrators work practically as a unit,—one discharging as the other is being filled. Each hydrator is driven by a 10-hp. motor with back-geared shaft, running at 108 r.p.m.

The hydrators discharge to two hoppers located above two 18-in. Bonnot mills, which form the final grinding unit. Each mill is driven by a 25-hp. motor. After grinding, the finished hydrate is conveyed by bucket elevators to the hydrated lime storage tanks of which there are two, each having 40 tons capacity. Lime is drawn out of here by the same method as that employed in the ground lime tanks and conveyed to hoppers over two Bates 4-valve bag machines. Here it is sacked and loaded directly into cars or into storage.



Batch-type hydrators showing measuring hoppers, drives, etc.

The hydrating plant has a capacity of 250 tons per 10-hour day and the product is marketed under the trade names of "Urschelime" "Plasterer's Favorite and White-Coat Special." There are also two brands of agricultural hydrate known as "Urschelime" and "Clover Blossom."

The plant is on the main line of the Pennsylvania R. R.

With the exception of two boilers for generating steam for kiln purposes the power throughout the plant is electricity. Power is furnished by the Lake Shore Electric R. R. and it is reduced to proper operating voltage by transformers at the plant. Approximately 1000 hp. is required to operate the plant.

Toncan metal siding and roofing was used to cover the buildings.

Associated with Mr. Urschel in this project is George J. Nicholson of the White Marble Lime Co., of Manistique, Mich. In charge of sales is Frank H. Holland for 14 years with the Kelley Island Lime and Transport Co.

Dayton (Ohio) to Have New Rock Products Industry

WHAT promises to develop into a large industry for Dayton is seen by officials of the Dayton Chemical Co., which was approved for incorporation at Columbus, Tuesday, by the secretary of state. Capitalization is fixed at $300,000.

Incorporators of the new concern claim they hold the only known deposit of rock outside of Germany, producing the chemical "ichthyol," used in curing skin and blood diseases. The deposit is at Burnett, Texas.

The incorporators are: Captain Frank E. Huston, Herbert S. Stafford, Dr. H. A. Penfield, Thomas Gilbert, all of Dayton, and Eugene Stagemann, New York chemist.

According to officials of the firm, the structure will not be an elaborate building at first, but will be erected in units as the business expands. The first unit is to produce an output of 600 lb. daily.

The company now operates an extracting plant at the deposits. The deposits were formed when the basin where they are located were under water. They consist of the rocks formed by the fossilization of marine animals. The rock resembles limestone encrusted with an oily black substance. This oily substance contains the chemical. It is extracted from the rock and will be shipped to Dayton in the crude form.

At present the chemical is selling for $12.50 a pound, retail, it is said. The new firm plans to reduce the cost materially, over the product which is now produced exclusively in Germany.—*Dayton Herald.*

Not All Ohio Quarry Property Is Valuable!

PORT CLINTON, Ohio.—Sheriff George Quisno sold 12 parcels of property of the Rocky Ridge Lime and Stone Co. at sheriff's sale for delinquent taxes. The property was sold to different bidders and the total sales were $5123.

In some cases the stone land brought as low as $2 for lots, while others sold at $5 and $10. One parcel of 4.92 acres brought $1. Some of the property was bought by the members of the Benton Lime and Stone Co., which recently oganized at Rocky Ridge. —*Toledo (Ohio) Bee.*

Fused Alumina Cement*

An Authoritative Review of European Progress Written Especially for Rock Products

By E. C. Blanc
Engineer, A. M., Gieres-Isere (France)
Translated from the original French by C. S. Darling

I—Definition.
II—Historical. Work of Bied, Spackman and Bates.
III—Manufacture—raw material—Burning and cooling—Grinding.
IV—Chemical composition.
V—Properties: Physical aspect. Phenomena of setting and hardening. Strength under mechanical strain. Resistance to chemical decomposition.
VI—Method of use—Uses.
VII—Bibliography.

DEFINITION—Under the name of fused alumina cement are grouped the cements obtained industrially by an ignious fusion of a mixture of proper raw materials, and in which the aluminate of lime constitutes the active hardening and setting element.

II—HISTORICAL—The hydraulic properties of the aluminates of lime have been the objects of a number of studies, some of which are relatively old. We should mention particularly the classic works of J. Bied in France, H. S. Spackman and P. H. Bates in America.

The researches of Spackman, commenced about 20 years ago, depended on the production of the slightly calcic aluminates, corresponding to the proportion of two to three molecules of alumina for one of lime. Spackman discovered that the addition of these aluminates, even in small quantities, to pure lime, hydraulic lime or natural cements, gives mortar of rapid hardening and high strength.

In 1909 the Aluminate Patents Co. was formed for the exploitation of Spackman's patents. Its object was the production of "addition materials," coming from a strongly aluminous slag resulting from the fusion of the iron ores of Mayari (Cuba).

Researches carried on at the same time by Bied in the laboratory of the *Societe des Chaux et Cements de LaFarge* (LaFarge Lime and Cement Co.) had resulted in the production of a cement with a mono-calcic aluminate base, obtained by the fusion of a mixture of bauxite and limestone, and placed on the market in 1912 under the name "Ciment Fondu" (patents of 1908).

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E. C. Blanc

The Author

THE author is a young engineer who received his degree as Doctor of Philosophy at the Ecole Nationale d' Arts et Metiers d'Aix in 1916. He has been in the research department of the Acieries (steel mills) du Saut-du-Tarn. In 1920 he joined the staff of J. Duchez Pere et Fils, consulting engineers for the construction and operation of lime and cement plants. Since 1923 he has been a consulting engineer himself in these industries. He has been a regular contributor to the "Revue des Materiaux de Construction" and is the author of a book on the technology of crushers, pulverizers and screens, which will soon be published. The article published herewith is the most complete exposition of the new alumina cements that has yet appeared in an American periodical, and the author is a recognized authority.—The Editor.

During the war this cement was used exclusively for military use, and its production remained but little developed.

Until 1919, the "Ciment Fondu" was manufactured exclusively in the water-jacketed furnace by the factories of LaFarge (Ardeche). At this time the manufacture of fused cement in the electric furnace was undertaken at Luchon by the *Bureau d'Organization Economique* by its staff (B.O.E.) and about one year later by the *Forces Motrices de l' Agout at Luzieres* (Tarn). This last manufacture was the result of experiments carried on by the *Acieries du Saut-du-Tarn* (steel mills of Saut-du-Tarn) at their factories at Saint-Juery. At the same time the *Societe des Chaux et Ciments de LaFarge* started successful manufacture on similar lines at Moutiers, in Savoy—in connection with the *Societe d'Electro-Chimie et d'Electro Metallurgie.*

In 1922, the *Bureau d'Organisation Economique,* under the auspices of J. Bied, who had left the *Societe de LaFarge,* transfered the manufacture of electric cement from Luchon to l'Argentiere la Bessee *(Societe Alais Froges Camargue)* and at Bex, in French Switzerland.

In 1923, the *Acieries de Firminy* started the successful manufacture of electric cement at their factory at St-Chely (Lozere). Finally, the *Societe des Ciments Vicat* is equipping under the direction of the *Bureau d'Organisation Economique* a water-jacketed furnace for the manufacture of fused cement at its plant at Genevrey-de-Vif (Isere).

In the United States there has just been formed the Atlas Aluminate Cement Co. for the manufacture of the same product.

In less than five years the problem of alumina cements has therefore made considerable progress, which shows the increasing interest in their remarkable properties.

III — MANUFACTURE — The alumina cements are produced industrially from a mixture of limestone and bauxite.

Limestone is universally known.

Bauxite is a hydrate of alumina, the most important deposits of which are found in the Midi of France. Its principal use is in the manufacture of aluminum, which requires a relatively pure mineral containing not more than 4 to 5% of silica and 5 to 6% of oxide of iron.

Fortunately the manufacture of the alu-

mina cements is possible with a much higher content of impurities, which permits the use of inferior qualities of bauxite.

Coal-mine shales have even been employed successfully, as well as the waste products of various aluminous processes.

The raw materials are mixed rather crudely, it being possible to vary the proportions within certain limits without changing the nature of the product.

The materials can be introduced in the raw state in the kiln, but it is generally recognized as advantageous to grind and dry them first. Some factories consider desirable the briquetting of the dry mixture, while others favor the preliminary roasting of the material in separate kilns.

The fusion is effected at the temperature of about 1450 deg. C., whether in the water-jacket of the type of those employed in copper metallurgy or in the electric furnace.

The water-jacket is constituted in principle like a small blast furnace with metal sides cooled by the circulation of water. It is furnished with hot-air tuyere, this air coming from the regenerative chambers in which the gases of combustion circulate.

The water-jacket has been exclusively used in the LaFarge factory for the production of the alumina cements sold under the name of "Ciment Fondu." Each kiln has a production of about 15 to 20 tons (the French ton is about 10% greater than the English short ton) of cement in 24 hours. It is reported that 750 kilograms (1650 lb.) of coke is used for each ton (2200 lb.) of cement produced.

The water-jacket kiln installed by the *Societe des Ciments Vicat* is provided for a production of 50 tons in 24 hours.

Fusion in the electric furnace was considered as a result of the high fuel consumption in the water-jacket. The furnaces used are of the arc type with one or two electrodes. The resistance furnaces could not be utilized because of the weak conductivity of the aluminate.

The average production of a furnace or kiln varies from 20 to 30 tons of cement in 24 hours. The current consumption is from 2000 to 2500 k.w. hours per ton produced. It is necessary to add the cost of the electrodes, which is very important (about 100 k.w. per ton of cement). Evidently the fusion in the electric furnace is therefore not appreciably more economical than fusion in the water-jackets, and it is especially a question of local conditions which decide the use of one or the other.

We will mention finally the fusion in the cupola with refractory sides, actually tried out by the *Societe "Alumine et Derives"* at its experimental factory at Bourget.

The kilns, either electric or water-jacket, make a continuous operation. The material is drawn about every 45 minutes, either in ingot molds or in a special wagon.

Cooling of Prime Importance

The question of cooling has a prime importance on the value of the product obtained. Phenomena of crystallization and rate of cooling are produced, the nature of which no one yet clearly understands, but which have considerable influence on the properties of the cement. The technique is still in an empirical state and each producer works with his secrets of manufacture carefully guarded, secrets which consist principally of knacks for obtaining suitable action with regard to the speed of cooling of the fused slag.

The mass after cooling generally presents the form of a compact brown rock with very fine grain, having about the structure and hardness of basalt. Sometimes, on the other hand, there is obtained a sort of black dross, very coarse, with a vitrified appearance. In certain cases, the mass pulverizes spontaneously on cooling. This phenomenon is attributed to the presence of the bi-calic silicate. The cement obtained by spontaneous pulverization may also have the same properties as the cement obtained by crushing the solidified rock, which is very curious.

The cooled mass is naturally broken up by the contraction. The division of the mass is accomplished in order to be able to proceed to a preliminary separation of the metallic pieces included (flakes and kidneys of iron) resulting from the partial reduction of the oxides of iron included in the bauxite. The rock is later mechanically crushed, then finely ground in the tube mill. In general the fineness required is very high, and such that the product is not more than 5% residue on a 175-mesh screen.

Difficult Grinding Operation

The grinding is very difficult because of the great hardness of the product (ciment fondu rock will cut glass), and as a consequence of the particles of iron which it is impossible to completely separate, even by putting a magnetic separator in the circuit.

Under these conditions the power consumption on the tube mill varies from 80 to 110 k.w. hours per ton of cement produced, while for portland cement it is only 25 to 35 k.w. hours.

The wear of parts coming in contact with the material to be ground is equally pronounced, so that it is necessary generally to count the upkeep expense at least double that for grinding artificial portland cement. Mills of large diameter and low speed with provision for water circulation, with the plates and the grinding parts in very hard steel, are to be recommended for this work.

After grinding, the cement shows the form of a slaty gray powder, which is put in bags or in barrels and shipped in the ordinary manner.

Brands Now Marketed

The principal alumina cements actually on the market are:

The "Ciment Fondu," sold by the *Societe des Chaux et Ciments de LaFarge et du Teil* and manufactured at its factory in Teil (Ardeche).

The "Ciment Electro-fondu," manufactured by this same company at the Moutiers factory (Savoy).

The "Electro-Ciment" of the *Forces Motrices de l'Agout* at Luzieres (Tarn).

The "Ciment Electrique de Bex," manufactured at Bex in Switzerland.

The Alumina Fused Ciment, manufactured by the *Acieries de Firminy* at their factory at St-Chely (Lozere).

The "Lumnite" Cement, manufactured at Northampton, Penn., by the Atlas Aluminate Cement Co.

Portland Cement and Alumina Cement Compared

IV—CHEMICAL COMPOSITION—The alumina cements differ clearly from the ordinary cement, or portland cement, in their chemical composition and in their properties.

AVERAGE COMPOSITION OF CEMENTS

Principal Constituents	Portland Cements	Alumina Cements
Silica SiO_2	20 to 25%	10 to 12%
Alumina Al_2O_3	5 to 9%	35 to 45%
Iron Oxide Fe_2O_3	2 to 5%	7 to 10%
Lime CaO	55 to 65%	35 to 45%
MgO	1 to 4%	

In portland cement the silica dominates with an average proportion of 3 of silica for 1 of alumina and 8 or 9 of lime, while in the alumina cement the alumina occurs in the average proportion of 4 of alumina to 1 of silica and 4 of lime.

If we consider the relation

$$\frac{\text{Silica} + \text{alumina} + \text{iron}}{\text{Lime}}$$

generally known under the name of "hydraulic index," the following averages are obtained:

	Portland Cement	Alumina Cement
Hydraulic index	0.42 to 0.55	1.15 to 1.80
Average	0.50	1.25

If we consider the relation $\frac{\text{Silica}}{\text{Alumina}}$ generally known under the name of silica modulus, we obtain the following averages:

	Portland Cement	Alumina Cement
Silica modulus	2.3 to 4.7	0.22 to 0.33
Average	3	0.27

It is to be remarked that the alumina cements clearly constitute an anomaly with relation to ordinary portland cement, for there does not exist, as might be believed, intermediate products having the qualities of one or the other.

Thus the portland cements, where the silica modulus is below 3 are *"ciment prompts"* or quick-setting cements, and immediately become useless as a result of their instantaneous set in proportion as this modulus decreases. Now the alumina cements, of which the modulus is only 0.25, are slow setting, which proves that it is a question of products altogether different.

From the point of view of the method of combination of the elements among themselves, the greatest uncertainty still rules on this subject. It seems nearly established, however, that the constituents of the portland cement combine in tri-calcic silicates

and aluminates, with a certain proportion of bi-calcic silicates and a liberation of the corresponding quantity of lime. The principal element of setting would be the tri-calcic silicates, or a formation approaching it.

The relation of the elements in contact in the alumina cements seems to show that the combination is established under the form of bi-calcic silicate and mono-calcic aluminate. The presence of the bi-calcic silicate SiO_2 2 CaO would be confirmed by the phenomena of spontaneous pulverization, observed on the cooling of the fused mass after withdrawing it from the kilns. It is known that the bi-calcic silicate is subject to effects of cooling, and that one of its allotropic forms, obtained under certain conditions of speed of cooling, spontaneously pulverizes.

The element causing set here is, therefore, according to all appearances, the mono-calcic aluminate.

Why Alumina Cements Are Valuable

V—PROPERTIES—The fused alumina cements have the form of a dark gray powder, almost black. The apparent density (weight of a liter loosely packed) is 1 and the specific gravity is 3, which corresponds closely to the figures for artificial portland cement.

The fineness required is generally greater than that for portland cement. For the latter, 15% residue on a 175-mesh screen is permitted, while with the fused cement not more than 5% residue is customarily permitted on the same screen.

Mixed with water the alumina cements form a mortar which hardens rapidly.

The beginning of the set, measured with a Vicat needle, takes place two hours after mixing, and the end of the set three to four hours after mixing. This corresponds roughly to the time of set of a good portland cement. The alumina cements are not, therefore, quick-setting cements, since the set of the latter cements is a few minutes after mixing.

The expansion test in Le Chatelier's mold shows that there is no expansion, which is explained by the total absence of free lime in the fused alumina cements.

On the other hand, the setting is accompanied by an increase of temperature relatively great. That is harmless for mortars and concretes, but may cause veritable deflagrations when the cement is used pure in large quantities.

After the setting the linear contraction is not more than two in 1000 with a neat cement, and 0.41 per 1000 for concrete in 1:5 mixture, or 300 kg. cement to 1 cubic meter of sand and gravel.

The fused alumina cements are rapid hardening.

A fused cement in a 1 to 3 mortar gives, in 24 hours, a strength equivalent to that of the best portland cement at the end of one month. This strength decreases slightly after seven days, without ever coming below that of portland cement. The manufacturers claim, besides, that they actually obtain products the strength of which continues to increase regularly with the length of time.

We give below the results of experiments on eight sets of samples, carried out with the fused cement of the *Societe LaFarge*.

Dates of Breaking	1 Day	2 Days	3 Days	7 Days	28 Days
Tension—Neat cement kegs	45	65	70	75	80
Tension—Mortar 1 to 3	35	37	37.5	39	39
Compression—Neat cement	800	875	925	975	1075
Compression—Mortar 1 to 3	405	440	460	485	495

To provide a comparison, the diagrams Figs. 1 and 2 show the respective strengths of the fused cement and of portland cement of good quality in 1 to 3 mortars.

Experiments have been carried on to measure the tangential adherence, or bond, of the fused cement to iron, which is of great importance in work in reinforced concrete. These experiments, carried on by the tension on an iron rod of 7 mm. in diameter, polished with No. 5 emory cloth and encased in a 1 to 3 mortar along a length of 4 cm. have given the following results:

TANGENTIAL ADHESION PER SQUARE CENTIMETER OF IRON SURFACE

Time of Experiments	7 Days	28 Days	84 Days	6 Months	1 Year
Fused cement, kilograms	31.04	34.17	29.54	36.25	37.57
Portland cement, kilograms	13.34	21.58	23.19	26.59	31.61

Chief Property Is Resistance to Sulphate Waters

The alumina cements have the valuable property of resisting the attack of sulphate waters (selenitic waters).

We know that nearly all the hydraulic limes are decomposed more or less rapidly under the action of sulphate waters. E. Candlot gave some light on the mechanism of this decomposition due to the formation of a sulpho-aluminate of lime of which the crystals expand in the interior of the pores of the mortar and break it up.

The sulpho-aluminates (Candlot salt) has a formula of $3(SO_3CaO)Al_2O_3 3CaO 30H_2O$.

The fused cement being constituted of a mono-calcic aluminate contains no lime in sufficient quantities for the formation of a sulpho-aluminate.

Indeed, the alumina cements have shown themselves practically free from attacks by sulphate waters. They have resisted official tests that have been very rigorous, some of which have lasted for seven or eight years. Numerous works carried out with the aid of these cements in sulphate regions have given entire satisfaction up to the present time.

Dr. Jeanneret has published the results of a series of comparative experiments on the resistance of portland cements and a fused alumina cement submitted to the action of different chemical agencies. The results follow:

1. Alumina cement is free from attacks by sulphate of lime (gypsum), while portland cements are distintegrated rapidly after three months.

2. Alumina cement resists the attack of alcoholic solutions (wine, beer, alcohol)—the same as portland cement.

3. Alumina cement is not so immune from the action of mineral oils as portland cement. This is of importance in certain special cases: oil tanks, foundations of machines, and so forth.

To sum up:

The fused alumina cements are cements of slow-setting and rapid hardening, giving at the end of 24 hours strengths equivalent to those of the better portland cements at the end of one month. These strengths increase with the time and are always higher than those of portland cement. Besides, the alumina cements are completely immune from attacks by sulphate waters, which render them particularly useful for work in the ocean or in sulphate regions (gypsum and anhydrite).

These form real advantages; it remains, unfortunately, to examine the question of price.

The current price (May, 1924) of the LaFarge ciment Fondu is 280 francs a ton (2200 lb.), or about two to two-and-a-half times the price of artificial portland cement.

This high price is explained:

By the high cost of the raw material (bauxite) the deposits of which are generally distant from the centers of manufacture.

By the high fuel consumption, whether the fusion takes place in the water-jacket or in the electric furnace.

By the difficulties of grinding.

This question of price limits the application of the alumina cements, which are reserved for special uses when the rapidity of completion or the exceptional strength attained are of greater importance than the cost.

VI—METHOD OF USING—USES. The method of using the fused alumina cements is practically the same as for ordinary portland cement.

It is recommended to carefully avoid the mixture, in no matter how weak a proportion, of fused cement with any other hydraulic cementing material. The utensils and the receptacles used for applying the fused cement should be carefully cleaned before using. Traces of free lime are sufficient to render the cement quick-setting and practically impossible to mix.

A fused cement is not very cohesive. Consequently, it is best not to use too dry a mortar, and to see that protection is taken against drying while the setting takes place. For concretes it is necessary to add sand in sufficient proportions and to have the tamping carefully done.

The proportions which have given the best results are: 800 liters of gravel from 5 to 30 mm. (approximately ¼ in. to 1¼ in.) for 400 liters of sand 5/10 mm. (about 60 mesh) and 156 liters of water with 200 to 300 kg. of cement.

Water easily dilutes fresh concrete. It is therefore necessary to be careful not to leave water at the bottom of the forms, and on raising the forms not to use a mixture that is too thin.

The forms should be made as water-tight as possible. These forms should be moist at the beginning and kept moist during the time of setting—that is to say, from two or three hours after pouring and for a period of about three hours. For masonry and for thin coats, cover with moistened sacks during the same period of time.

The resumption of the work after raising the forms can be accomplished satisfactorily by chipping the surface in order to make it rough. Brush vigorously and wash this surface with plenty of water before the application of a new mortar.

The alumina cements have already been put to a number of uses.

They have been used for work in sulphate regions, especially where a high sulphate content is to be feared. Thus the P.L.M. (*Paris Lyon Mediterannee*, a railroad operating between Paris and the Midi) has already used more than 7000 tons of La-Farge fused cements for tunnels, viaducts and similar structures along the line from Nice to Coni, especially where this line encounters sulphate earths.

The alumina cements are equally useful for reinforced-concrete work, paving, cement work, wherever the rapidity of the completion of the work is of greater importance than the cost.

Along this same idea, we mention highway work: repair of paving, highways, sidewalks, and so forth, in large cities where it is necessary to tie up traffic as little as possible. The *Compagnie des Transports* about Paris has thus employed advantageously fused cements for the foundations for street car tracks (put in service at the end of eight days instead of 21 days for portland cement).

Similarly, floors for factories, garages, and so on have been put into service at the end of a few days, often at the end of only 24 hours, thanks to the use of fused cements.

By the same process it has been possible to get rapid and extrordinarily strong jobs of repairing and emergency work.

The rapidity of hardening of the alumina cements permits the removal of the forms in reinforced-concrete work very quickly. The forms for girders can be removed with perfect safety at the end of three days, and walls at the end of 24 hr. This gives the double advantage of shortening the time necessary for the work and permitting the forms to be used over again more quickly as they remain in one place a much shorter time, requiring, of course, less material for forms.

The *Compagnie du Nord* (the railroad serving the northern part of France) has used fused cements for reconstruction where the least possible delay of certain work was of prime importance. The remodeling, enlarging and repair of buildings in reinforced concrete have been carried out thanks to fused cements, in a minimum of time.

The alumina cements are resistant to shock and have generally given complete satisfaction when used in reinforced-concrete piles, driven almost immediately after having been removed from the forms.

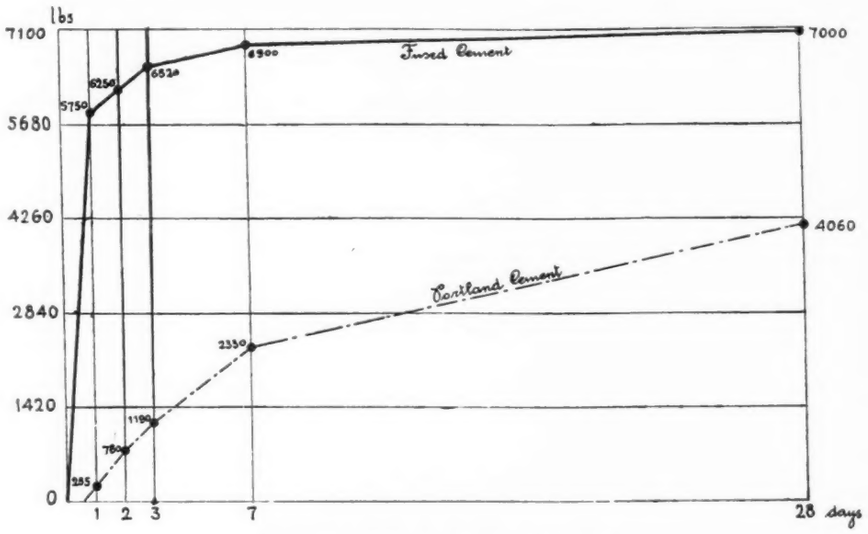

Fig. 2—Compression tests 1:3 sand

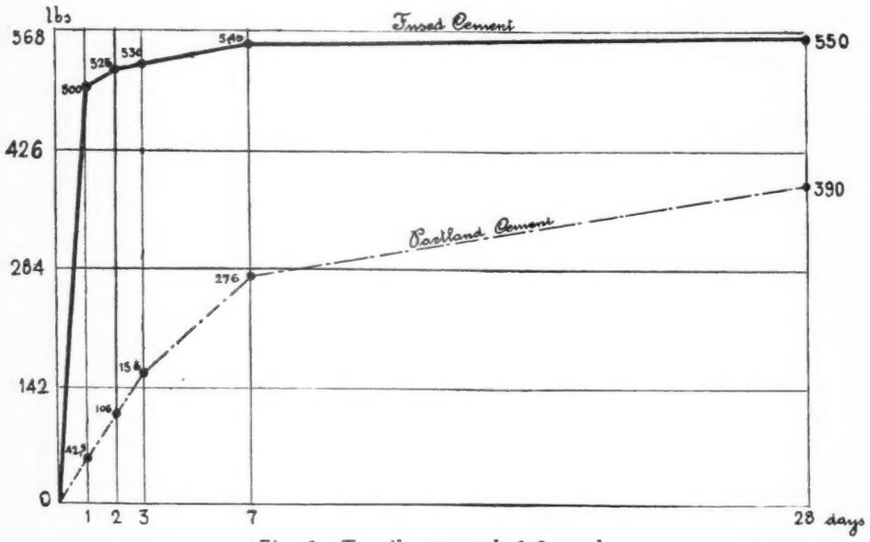

Fig. 1—Tensile strength 1:3 sand

The greater impermeability of these concretes as compared with other concretes, makes them useful for vats for wines, beer and cider, paper-mill tanks, and hydraulic work; pressure tanks, pressure lines, and so forth.

The greater strength obtained by using alumina cements has permitted the consideration of a revision of the coefficient used in calculating its application to reinforced-concrete work. Experiments on the LaFarge fused cements have been carried out along these lines at the *Conservatoire National des Arts et Métiers*, under the technical direction of M. Georges Leflot, director of *maison Hennebique*.

We reproduce below the conclusions of the first series of experiments, the results of which have been published.

1. Fused cement concretes permit the removal of the forms at the end of three days of hardening, the minimum factor of safety obtained at that date having been 1.9.

2. In adopting the same method of calculation, the same allowable stresses and the same proportioning as with portland cement, factors of safety 1½ to 2 times higher for the fused cements have been obtained.

3. Taking the method of calculating and the ordinary mixing ratio for portland cement of 300 kg. (per one cu. meter of

sand and gravel) and using only 200 kg. of the fused cements, higher factors of safety have always been obtained for the latter over the former.

4. Using the same methods of calculation as for portland cement (that is to say, not counting any strength of the concrete in tension and requiring of the metal 12 kg. per sq. mm. in tension)—[this is equivalent to 16,000 lb. per sq. in.]—but taking for the allowable stresses of the concrete the following:

> For the Hennebique method, 56 kg. (about 780 lb. per sq. in.) for the proportioning at 300 kg. and 39 kg. (about 550 lb. per sq. in.) for the proportioning at 200 kg.; for the calculation according to the *Circulaire ministerielle* (French Standards), 100 kg. (about 1400 lb. per sq. in.) for the proportioning at 300 kg. and 70 kg. (about 1000 lb. per sq. in.) for the proportioning at 200 kg., the coefficient *m* being taken equal to 6; then—

The same factors of safety have been obtained as with the concrete of portland cement (working with the usual figures: 25, 18, 44.8 and 33.6), for columns and the majority of slabs; slightly less for certain slabs and for beams. As a precaution we can even reduce the allowable stresses indicated above respectively to 50, 35, 90, and 62 kg. per sq. c.

Deflections obtained with fused cement concrete are always appreciably more than those obtained under the same conditions with portland cement concrete; it seems, however, that at the moment just before rupture, the deflections are appreciably the same for the two concretes.

According to the results, the use of fused cement concrete would permit not only the more rapid removal of the forms and reduction of the time of completion, but still further, for an equal strength an economy on the proportioning and on the section of the various parts.

All these considerations show the considerable interest which the fused alumina cement presents, and the new possibilities which they carry in the construction of public works.

In spite of their high price, the field of their application becomes from day to day broader, and it may be that at some time not too far distant the alumina cements will take the place of portland cements. We have here a technique in evolution. Investigators are pushing hard on both sides and no one can foresee which it is going to be, alumina cement which can be made at lower cost, or portland cements of greater strength which are actually being sought after by a better control of the manufacture.

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Motion Picture to Tell of Dynamite

THE PRODUCTION of a motion picture film which will illustrate graphically the manufacture, transportation and use of dynamite is the object of a co-operative arrangement recently made between the Department of the Interior, through the Bureau of Mines, and the E. I. du Pont de Nemours Co. The matter of safe method in the storage, transportation and use of dynamite will be especially stressed in the making of the film. It is expected to begin production of the film in August, and it is hoped that in the early Fall the film may be ready for circulation by the Bureau of Mines, for exhibition by educational institutions.

Oil Shale in Esthonia Finds Many Uses

THE Esthonian Portland Cement Works, Port-kunda and Asserin have now entirely substituted oil shale for coal, and up to the end of 1923 had 268,000 tons of oil shale. Their requirements for 1924 are calculated at 120,000 tons. The shale is powdered and used in rotary kilns like pulverized coal.

For heating boilers in factories oil shale was used for several years. As a result of experiments made during this period, a furnace of a special type (a large chamber for burning with movable or stop-fire grates, a fire-resisting axle and a secondary air supply) was constructed since when several larger factories under the conviction that oil shale is the cheapest and most suitable local fuel are reconstructing their boiler houses for heating with oil shale.

The railways have consumed 68,000 tons of oil shale for the heating of locomotives, buildings and workshops, and have ordered 42,000 tons for 1924. At the end of 1923, 54% of locomotives maintaining the communications were heated with oil shale. Furnaces of other locomotives are in process of being furnished with movable fire grates for the purpose of heating with oil shale. Oil shale is used also in smithies.

The oil shale gives as much gas as good gas coal. In 1920 Tallinn (Reval) was lighted with pure oil shale gas. In ordinary horizontal retorts built for the purpose of using coal oil shale has given up to 283 c. m. (10,000) cu. ft.) gas per ton of shale.

No Chance for American Potash Producers

IT NOW appears that, as usual, the French and German potash producers are to share the bulk of the business of the American consumers, as they have for the past two years. They are quoting prices which the practically defunct American industry cannot hope to meet, excepting in certain sections of the country where it is favored by freights, but where, unfortunately, very little fertilizer is manufactured or consumed.

Potash today is selling at prices well below the pre-war levels. Competition between French and Germans enables the fertilizer industry and the farmer to get potash at extremely low prices. Even at these prices the fertilizer industry is harassed and the farmer complains of his costs. At the moment there is only one domestic producer who is marketing potash. One other small plant is manufacturing or is about to manufacture, but will use its product to make mixed fertilizers. Even when fifty odd plants were running during the war the output of the country was far below the normal or desirable consumption of the material. At the same time the price averaged fully eight times the levels quoted by Germans and French at present.—*New York City Journal of Commerce.*

Visiting Pennsylvania and Maryland Quarries with a Geologist

Limestone Strata Vertical—Washing Crushed Stone—Glass Sand for Plate-Glass Manufacture

By Edmund Shaw
Editor, Rock Products

THE limestone deposits around Harrisburg, as in most places in central Pennsylvania, show the effects of folding, so that they stand more nearly vertical than horizontal. Consequently they can be deepened as well as extended laterally. The limit to which they can be deepened is usually determined by the water that is encountered. As Mr. Wil-

Quarry train in a Maryland glass sand quarry

A Maryland glass sand quarry. The rock at the right is waste rock which forms a "foot wall"

Hazel-Atlas Glass Co.'s washing plant and glass sand quarry

Employes' cottages. Hazel-Atlas Glass Co., Great Cacapon, W. Va.

son of the Hoffman Bros. and Wilson quarry put it: "We can go down so long as it is cheaper to pump water than it is to move dirt," meaning the dirt which has to be stripped from the surface.

This kind of quarrying, which is really a form of open cut mining, has its dangers, as was shown at the Paxtang quarry a few miles out of Harrisburg. This quarry, which was one of the best paying small operations in the district, had been extended to its property lines. The depth was not great and it was decided to sink 35 ft. over the whole area. After this was worked out another "lift" of 25 ft. was started, but had not progressed far when water was struck and in three days the quarry was a lake. Mr. Whittrock, who owns the quarry, was fortunate enough to save his steam shovel and other equipment. A more detailed description will be found elsewhere in this issue.

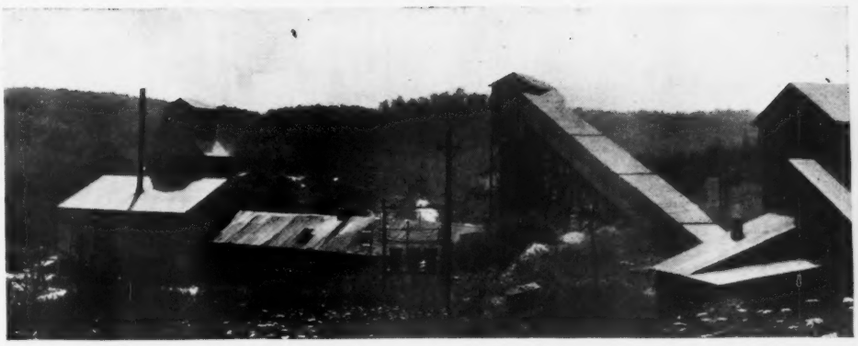
Bethlehem Mines Corp. Crushing Plant

The largest quarry near Harrisburg which I visited is that of the Bethlehem Mines Corp., a subsidiary of the Bethlehem Steel Co. This quarry, which is one of many operated by this company, produces flux stone for the furnaces and crushed stone which is sold in the open market. The visit was interesting from many angles. I was quite impressed with the work of a single roll crusher, made by the McLanahan Stone Machinery Co., a huge affair with a roll 36 in. in diameter and a feed hopper about 10 ft. square. It was set at the top of the plant where one would have said the vibration would seriously affect the building. Yet the vibration was slight, even when the largest pieces of stone were fed. The roll literally "chewed them up" in a nonchalant sort of fashion and made no particular fuss about the job.

As in so many other places which I have visited on this trip, I found changes and additions to increase the output of the plant in progress. A No. 8 Allis-Chalmers gyratory was being installed as a secondary crusher to follow the single roll crusher described above. At present a No. 6 Allis-Chalmers does the work and in the new flow sheet this will be used to crush oversize after the product of the No. 8 crusher has been screened.

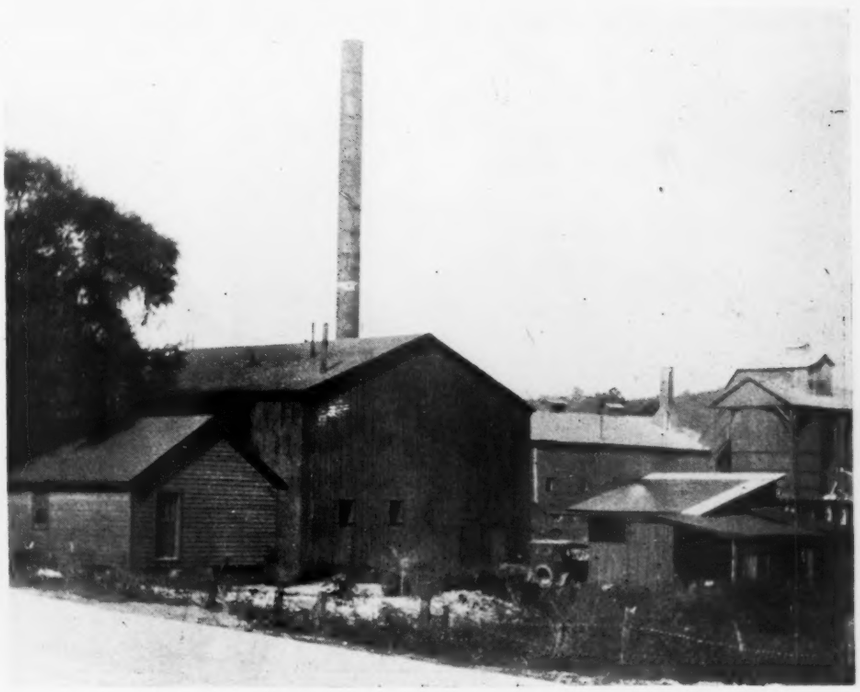
Washing Crushed Stone

The Bethlehem Mines Corp. has washed a good deal of stone, using log washers for this purpose. Washing crushed stone seems to be growing in favor. The National Limestone Co. was planning to install Lewistown sand washers for washing its fines when I was at the plant recently and other companies are planning to put in the same or a similar machine. But the most complete stone-washing plant I have seen or heard of is that of the Birdsboro Stone Co. near Reading. This company has been wash-



Berkley Springs plant of the Pennsylvania Glass Sand Co.

Crushing and washing plant of the Birdsboro Stone Co.



West Virginia plant of the West Virginia and Pittsburgh Sand Co.

ing practically its entire output of crushed trap rock since 1922 and has erected a splended all steel plant that turns out 4000 tons a day. Such a clean and well sized product as it turns out represents the acme of crushed stone production.

Studying Geology

I was very fortunate in having R. W. Stone, the assistant state geologist of Pennsylvania, whose writings are known to Rock Products readers for a companion in the trips around Harrisburg. It was fascinating to hear his explanations of the various formations as we drove by them. I wonder if anyone gets more joy out of life than a geologist? To him the surface of the earth is an opened book which he never tires of reading. The geological bureau of Pennsylvania is a wonderful organization, as it ought to be where so much of the wealth of the state is in mineral products. It has specialists in coal, iron, limestone, etc., and they are all very busy, not always in mapping and making investigations that may be of use some time in the future, but more often on very definite and immediate problems for which a solution is wanted at once. The rock products and mining industries of the state have learned to appreciate the work of the bureau and to utilize it as a source of much needed information.

Silica Operations in Maryland and West Virginia

From Harrisburg I went south into Maryland and West Virginia, primarily to see the silica sand operations which have risen to be of so much importance in that section since the war. But I saw other things of interest, for this section is strong in crushed stone and other rock products. I think I saw a quarry large or small near every station at which the local train stopped.

At Hagerstown, a place which claims 35,000 inhabitants and looks to have twice that population, I visited the unusual cement plant of the Security Cement and Lime Co. It is unusual in the first place because it is a dry process plant, but it is still more unusual because it makes cement from most unpromising raw materials, using coal ashes and a limestone that is none too uniform in composition. In spite of this it turns out 5500 bbl. a day of cement of the highest grade as attested by the Bureau of Standards, which tests a lot of it, bought for government use. The system of correcting, beginning at the quarry and carried all through the plant, accounts for this, and it has been wonderfully well worked out.

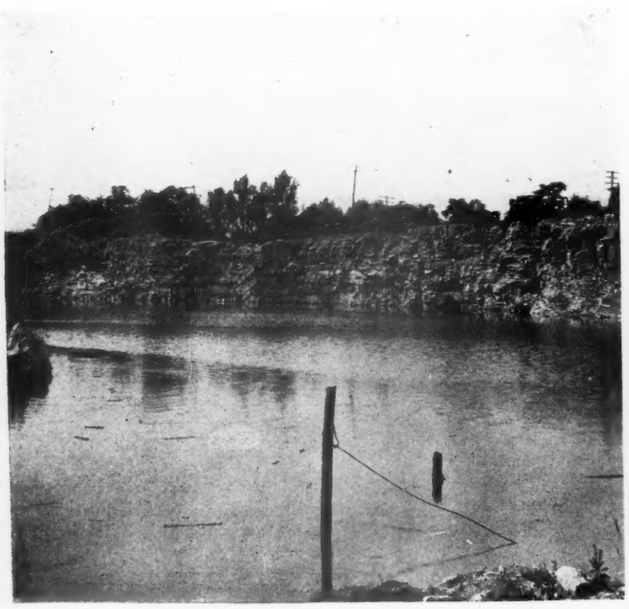
I am saving a description of the silica sand operations of the Maryland-West Virginia field for an early issue. Suffice it to say here that they are about as well-designed and equipped plants as can be found in any of the rock products industries. Brick and concrete have been freely used in the buildings which house the dryers and the finished product. The wooden structures are well built and kept painted. In some cases whole villages of neat cottages have been erected to house the employes, all of which testifies to the permanence and stability of the glass sand industry.

The sand here is of excellent quality, which of course accounts for the fact that the companies have been willing to make such large investments. It is about as near pure silica as can be found in large deposits and most of it is used in the making of plate glass, for which only the highest grade of sand will serve. It is quite probable that the windshield on your automobile was made from the glass sand of this district.

One Quarry Flooded—Old Quarry Reopened

J. M. Whittrock, Paxtang, Pennsylvania, Strikes Underground Flow But Fills Orders from New Quarry Operation Within a Week's Time

J. M. WHITTROCK, proprietor of the Paxtang Quarry, had one of the best small quarries in the vicinity of Harrisburg, Pa. Now the boys of the neighborhood use it for a swimming hole, and it was only by working day and night, while four pumps labored to keep the water down, that the quarry equipment, including the steam shovel, was saved.



The water is 85 ft. deep in one place. The quarry filled, as shown in the picture, in three days after the water was struck

The crushing plant which, fortunately, stood too high to be submerged, and arrangements were quickly made to keep up its supply of stone

The last shot struck an underground water flow that filled the entire quarry in three days. Fortunately the crushing plant was so situated that it was in no danger and also it was placed so that stone could be brought to it from a quarry which Mr. Whittrock had abandoned some years before, but which still contained considerable good stone. Mr. Whittrock lost no time bemoaning the fate of his quarry. He turned the men into the old quarry and in less than a week was producing stone and shipping it to his customers.

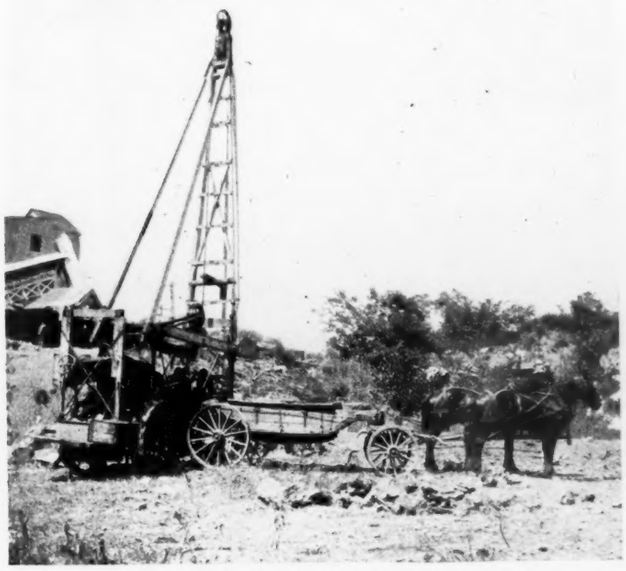
These quarries had two things in common with all the other quarries around Harrisburg. There is always more or less water to be pumped and the rock does not lie in horizontal beds but is broken and folded or else it stands on end. Consequently in these quarries the depth of the working is not determined by the thickness of the ledge. The workings can go as deep as desired or until the cost of pumping the water becomes prohibitive.

Was on Third Lift

The quarry which was flooded was originally worked to a depth of 35 ft. and this working was dry. A second "lift" of 22 ft. was made in which some water was encountered, so that pumps had to be put in. After this was worked over the area of the quarry it was decided to go down 25 ft. more. A space had been cleared 100 ft. square and put down 18 ft. when the water flow was encountered.

The quarry which was flooded was one which Mr. Whittrock opened several years ago. It was an excellent deposit of stone but the area was small and as it was cut off by railroad property there was no chance of buying additional land. Hence the only way to go was down.

The older quarry now being worked again was Mr. Whittrock's first purchase in this locality, in fact he worked it under lease for some years before buying. As this was extended it ran into old "solution channels" filled with earth which made extension difficult and it was judged



Well drill beginning to sink on the old quarry floor

After the quarry was submerged, work was begun on the floor of the abandoned quarry

The sump from which the drainage of the present quarry is pumped

Pump used to drain the present quarry

better to open new ground than to sink. Test holes, however, did not develop much of a water flow so that this quarry will now be deepened.

The plant makes a specialty of producing the smaller sizes of crushed stone.

J. H. Whittrock, who can still smile after seeing his quarry flooded

There are five jaw crushers, some being spares.

Some water which has been encountered in the new workings is being handled by a 6-in. Worthington double plunger pump, of the flywheel type.

Some Pennsylvania Contract Prices for Crushed Stone and Sand

WITH the awarding of a new contract last evening by the township board of commissioners for the furnishing of stone and sand for road and street improvement work in various parts of the township, which was held up by injunction proceedings instituted by a number of township citizens, construction is expected to be resumed at once and rushed at top speed.

The commissioners, at their June meeting, entered into a contract with the Shamokin Quarries Co. for 2500 tons of stone and sand. A bill in equity was subsequently filed in the county courts, asking that the commissioners be restrained from going ahead with the contract on the ground that the letting was irregular and illegal. Particular stress was laid upon the fact that Harry F. Reinhardt was township engineer and was also principal owner of the Shamokin Quarries Co. It was also claimed that one bidder had not been given a fair opportunity to submit his bid.

Rather than engage in lengthy court litigation and hold up the road work, the commissioners re-advertised for bids to be submitted at the August meeting. At the same time Harry Reinhardt resigned as engineer in order that there could be no further objection in the event his company was the lowest bidder.

Type of home-made car used

The surprise came, however, when the bids were opened and it was found that the bid of the Hillside Quarries Co., a new concern, recently organized here, was the lowest. Two other bids were presented, one by the Shamokin Quarries Co., and the other by the Birdsboro Stone Co. There was little debate on the matter and the contract was promptly awarded to the Hillside company.

The successful bid was considerably lower than either of the others submitted. Under the contract with the Hillside company the price of crushed stone at the quarries will be $2 per ton, while if delivered to the various districts in the township the cost will average about $3 per ton, according to the distance that it must be hauled. This price is the same for Nos. 2, 3 and 4 stone. The maximum number of tons of stone and sand to be purchased under the contract is 2500. —*Shamokin (Penn.) Dispatch.*

Good News for Silica Producers —Increasing Use of Sand Blast

THE sand blast seems to be continually finding new and wider fields of employment. It began with the roughest kind of work—cleaning castings in the foundry, and then it naturally found other work in the metal industries for cleaning surfaces to be lacquered or electroplated. Now it is finding its way into the power house.

At the annual convention of the American Waterworks Association, Mr. Leonard A. Day told of the effective application of the sand blast at the St. Louis pumping station, where steam turbines are used to drive centrifugal pumps. It was found that the efficiency of the units had fallen 25% from the initial and guaranteed figures; and investigation revealed that the first five rows of turbine blades were almost completely closed with sediment.

After the replacement of a few rows, the entire blading surface was given a thorough sand blasting. This effectually removed all the scale; and, upon the resumption of service, the original steam consumption guarantees were equaled. The sand blasting of boiler tubes is an established thing, removing soot as well as scale and leaving the metal surface clean; but the sand blasting of turbine blades seems to be an entirely new practice.—*Compressed Air Magazine.*

Silica Investigations of Bureau of Mines

IN the course of a general study of the technology of silica, being conducted by the Department of the Interior through the Bureau of Mines, observations have been made recently in the glass-sand and ganister districts of Mapleton and Mt. Union, Pa., and Berkeley Springs, W. Va. Methods of quarrying and mining were studied, including the use of explosives. Although the workings are all open cuts in the glass-sand quarries, loading of ore is done almost entirely by hand. In only a few instances are steam shovels used.

Washing or milling plants for glass-sand are very much standardized in the two districts, with the exception of methods of handling the wet, washed sand. These varied from handfeeding of bucket elevators to overhead traveling cranes with clam-shell bucket. The output of the two districts is almost the same, as far as quality is concerned, as they are mining the same bed of sandstone and using similar methods. One pulverizing plant at Berkley Springs was visited where the washed sand is ground in tube mills. The product is used almost entirely in the ceramic industry. In all, nine plants were visited in the two districts.

Additional samples of silica were collected and a study begun of the difference in finished product between material ground in batch type and continuous mills. In connection with this, determination of grain size of finished products was made on several samples. Screen analysis and microscopic examination were made on samples of glass-sand collected.

Graphite in 1923

THE GRAPHITE MINING industry in the United States made considerable progress in 1923 according to a report prepared in the Department of the Interior by the United States Geological Survey, in cooperation with the geological surveys of Alabama, Michigan and New York. During the World War this industry flourished, for graphite is an essential war mineral, and large stocks of it, both domestic and foreign, were accumulated. Consequently in the years immediately after the war the industry languished. In 1923, however, there was an increase in the quantity sold and imported, as well as in value, the sales amounting to 4056 tons of amorphous graphite and 3,964,900 lb. of crystalline graphite, compared with 2200 tons of amorphous graphite and 1,849,766 lb. of crystalline graphite in 1922. The manufacture of artificial graphite at Niagara Falls, N. Y., reached the high mark of 26,761,015 lb., more than twice the output there in 1922.

The Operation of a Centrally-Controlled Electric Quarry Railway System

Impressions of a Visitor at the Marble Cliff Quarries, Columbus, Ohio

THE centrally controlled electric haulage system in use at one of the Marble Cliff Quarries Co.'s quarries, near Columbus, Ohio, handles an average of 3000 tons daily with 12 cars. Each car is loaded with 14 tons on the average. It can do considerably more than this as the system has handled almost 4000 tons on certain days.

The average length of haul is about a mile. A part of the route is over a single track bridge which is the "neck of the bottle," that production men talk about. But the interference with transportation on account of this "neck" may be considered negligible, for on one occasion 302 cars were sent over this bridge in 5 hr., or just a little over a car a minute.

eration of both plant and quarry in the way the feed is sent to the plant. With trains of cars the feed is necessarily heavy at the time a train is dumped; then there is a blank space and then another "hump in the curve" as the next train unloads. But with the single cars coming in with clockwork-like regularity the feed is even and the No. 21 Allis-Chalmers crusher is kept reasonably busy throughout the full working time.

The same uniformity and regularity of operation is of equal value to the steam shovel, which does not have to lay by, waiting for cars, and then hustle to load a train with often a second train waiting to pull into place.

As the name of the system indicates, the speed and direction of every car is controlled by a centrally located operator, who stays in a tower, from which he can overlook the movement of the cars. One single tower could not serve this entire system for obvious reasons, so the system is divided into three parts, each of which is separately controlled. Each operator can switch the cars from one of his tracks to another as well as control the speed and direction of the cars. In addition to the tower control there is a "spotting section" at each steam shovel, controlled from the shovel, so that the empty car can be placed where it is most easily loaded.

To follow the system through, one may start with a car that has just been loaded. The operator at the steam shovel starts

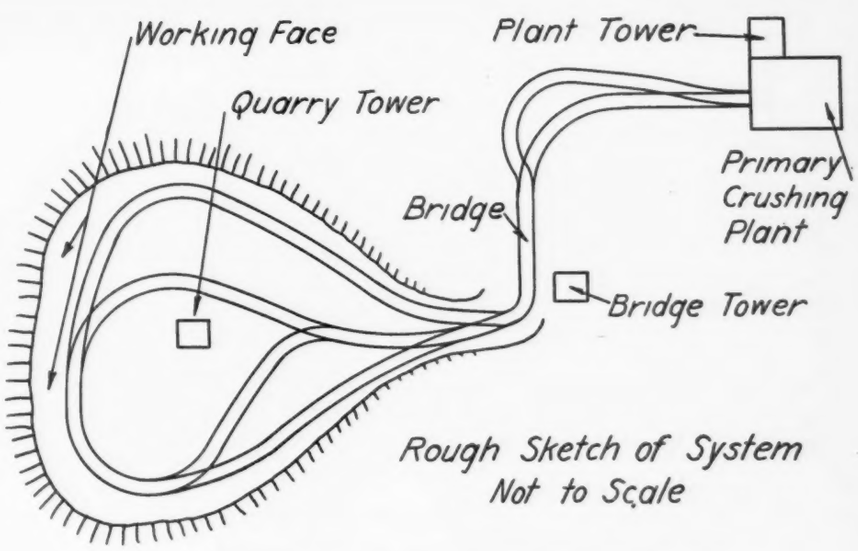
The quarry floor

Loading the car

According to H. R. Welch, general superintendent, who is in charge of the operation at the quarry, it would require eight trains, each of which would consist of a dinky and ten cars to handle the tonnage under the same conditions. This is two trains for each of the four steam shovels employed in loading and the allowance does not seem excessive.

The advantage of the system is not only that it can handle the material so rapidly and with such a limited number of units, but that it lends itself so readily to extensions in the length of the haul and to increases in the tonnage handled. Buying another car will give the equipment necessary for a considerable increase in tonnage or for a considerably longer haul. Mr. Welch estimates that by buying only a few more cars, and double-tracking the bridge, the system would readily handle double the present tonnage.

There is a further advantage to the op-



Sketch plan of quarry transportation layout—not to scale

it out on the main line of the quarry. It is picked up by the operator at the quarry tower and sent the length of the quarry to a narrow cut at the quarry entrance, where it passes out of his sight and out of his control to be taken in charge by the operator in the main tower at the end of the bridge. This operator holds it if an empty car is coming over the bridge, and when the track is clear he sends it across and around a long curve that leads to the plant track. When it passes out of his sight and control at the end of the curve the man in the plant tower takes it and sends it to the plant where it is dumped. It is then switched to the return track and sent back to the steam shovel.

The system is a third rail system resembling that used on city elevated roads, and of course each car has its individual motor and transmission gearing. The third rail is not continuous but is divided into sections of lengths varying according to circumstances. Each of these sections has its separate switch at the tower, so that the motion of a car on one section is independent of the motion of the cars before and behind it. Ordinarily two cars are not run on the same section, although this can be done and is done when it is required to send the cars through rapidly. But the operator has ample notice of the fact through his switch, and this gives the system the characteristics of a railroad block system.

Switching is accomplished by means of a simple electro-mechanical switch driven by a small motor. The motor drives a screw through a worm gear and the switch is connected to a nut on this screw which moves forward or back according to the way the screw is turned. There is a signal box at each switch with a white lamp above and a red lamp below. When the white lamp glows the switch is set for the main line and when the red lamp shows it is set for the cross over.

The current employed is 250 volt, d.c. It is furnished by a motor-generator set in the base of the tower at the bridge and is distributed by heavy cables which are strung on poles a part of the way and laid on the ground at switches and other places where the line cannot be supported. Through these cables the current is carried to the third rail sections. The return of the current is through the rails in the ordinary way. All rail joints in the same section are bonded with heavy copper wire.

The operation of such a system takes a man with a good head, who will not lose it in an emergency, and who has had a thorough training. The company makes its own operators, picking a man who seems to have the proper capacity and placing him under an experienced operator for a period that is sometimes as long as five months. Men vary in their ability to learn the handling of the system, some of them picking it up in the course of a few weeks while others (who make equally good men in the end) require as many months under tuition.

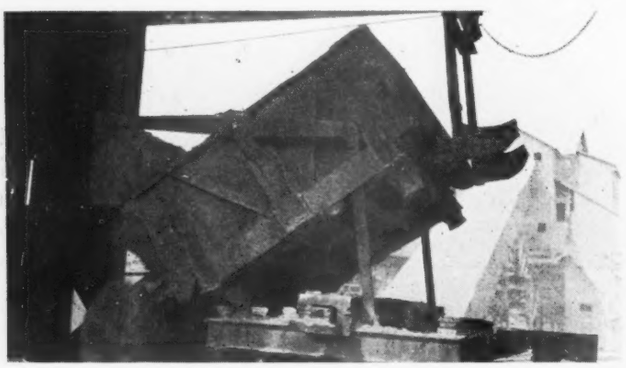
Accidents are rare but they happen as they do with every transportation system. The writer happened to see one which came from a broken rail in the track over which the empties were being returned. The system was run as a single track system for about an hour while the car was being pulled out of the ditch and the rail welded with an acetylene torch. After which the work went on over the double track. It was an excellent example of the flexibility of the system, and the delay to the loading was not very serious. Occasionally even the best of operators will bump one car with another but usually when this happens the damage is not important.

Night work is possible owing to the fact that the operator can tell from his switches just when a car enters and leaves a section, and if he has two cars on the same section. Lights are placed at critical points. In this way the system has been run at night with practically the same efficiency as in the day time, but of course daylight work is preferred.

Outside of bonding for the current and keeping up the third rail, there is no dif-

Electrically operated switch and signal light. The light in the picture shows switch is set for the main line

Car and bridge tower



Car dumping—note hooks

The dinkey still has a job. It cools steam shovels and derailed cars back on the track

The plant tower—car in position to be dumped to crusher. The counterweights for the car dumper hooks are outside of tower

ierence in the track laying and maintenance of this and any other system. In track laying the outside rail of curves is not raised nearly so much as with tracks for locomotives. The construction of the car is such that it does not require the high outer rail, and derailment is easier if this rail is too high.

One naturally thinks first of the danger in connection with a third rail system, but with a 250 volt current this is practically negligible. One can stand on a tie and put his foot on the third rail without feeling the current through ordinary shoes. Of course if one were to stand on a rail and put a foot on the third rail the results would be unpleasant, but not ordinarily fatal.

There is, however, a danger to men who are unaccustomed to working in a quarry where this system is employed. The cars are moving so regularly that no part of the track is safe for a promenade, and one has to keep his eyes open when he is crossing tracks. But that is nothing to one who is used to city traffic. In fact the danger appears to be rather less than that one would meet in crossing the streets of any good sized town. The speed of the cars does not exceed 20 miles an hour and an approaching car makes noise enough to warn one in time to step out of the way.

Marion railroad-type steam shovels are used for loading, a dozen or more being in use for loading and stripping the sizes running from Model 30 to Model 100. The quarry face is 42 ft. high and blasting is by well drill-holes put down with a 6-in. bit. The holes are not carried below the floor of the quarry. Trojan powder is used, the whole load being placed in the bottom of the hole. Holes are spaced 12 ft. apart.

The writer saw a big shot fired and the movement of the rock with the blast showed an intelligent and economical use of powder. The whole face seemed to move forward in a mass without any wasted effort of throwing stones aside or of fragmenting them more than was necessary for loading. About 2% of the pieces have to be broken by pop shots before the shovel can handle them.

The system was installed by the Woodford Engineering Co., Chicago, Ill., and it is used in a number of other quarries in this country. It has been in use in the Marble Cliff quarry for about six years.

To Ship 100-Car Train of Agstone to Pennsylvania County

A LIMESTONE day for Westmore'and county (Pennsylvania) is the next gigantic venture of the farmers, in co-operation with the farm bureau.

One hundred cars of pulverized Michigan limestone for distribution on the land of Westmoreland county is to be given a monster reception on its arrival in Greensburg on September 4, when it is expected that about 10,000 persons, from every nook and corner of the county, will dispel work for a day and be at home in Greensburg.

The limestone will be redistributed from Greensburg to the farmers throughout the county. The 100 cars will come direct from the quarries and it is intended to make the receiving day a real farmers' day at the county seat. The limestone will cost the farmers about $18,000 and they confidently expect that it will be worth $100,000 to the farming industry of the county.

In connection with the receiving of the limestone officially in the county seat, the day will be given over to various other pursuits. It is planned to bring a nationally known agricultural speaker to the county to address the farmers at some point to be selected later. There have been many mentioned and it is only a matter of a few days until this will definitely be established. The speaking program will probably take up a short time in the afternoon of September 4.

The reception and program that will be followed out will be similar to that held in Indiana county last year when many Westmoreland county farmers came to this county for the day.

In preparation for the limestone farmers day in Greensburg a series of meetings will be held throughout the county in the various centers of agricultural industry. These will start next week and will continue for several weeks until all parts of the county have been visited. At these meetings motion pictures will be shown of the manufacture of limestone together with other films on agricultural subjects which have been prepared by the United States Department of Agriculture.—*Blairsville (Penn.) Dispatch.*

Ripy Brothers Buy High Bridge (Kentucky) Quarry

THE Kentucky Stone and Sand Co., of Tyrone, Ky., of which Ripy Brothers are proprietors, have just closed a deal with Hon. James Dorman and Thomas Nutter for the purchase of the plant and quarry of the American Stone and Ballast Co., at High Bridge, according to announcement made by Col. T. B. Ripy, who was in Lexington recently. The consideration was not made public.

The property comprises 23 acres, 10 acres of which is considered some of the finest stone in Kentucky, of the same limestone formation as the famous Tyrone quarry, which Ripy Brothers have operated for many years. The High Bridge plant is now being operated by the new owners, who are getting out about 10 carloads of crushed stone daily.

Ripy Brothers sometime ago purchased a tract of land underlaid with similar stone on the old Frankfort pike, near Lexington, but Col. Ripy stated that this is being held in reserve and will not be opened for some time.—*Lexington (Ky.) Leader.*

The quarry tower of centrally controlled haulage system, Marble Cliff quarries

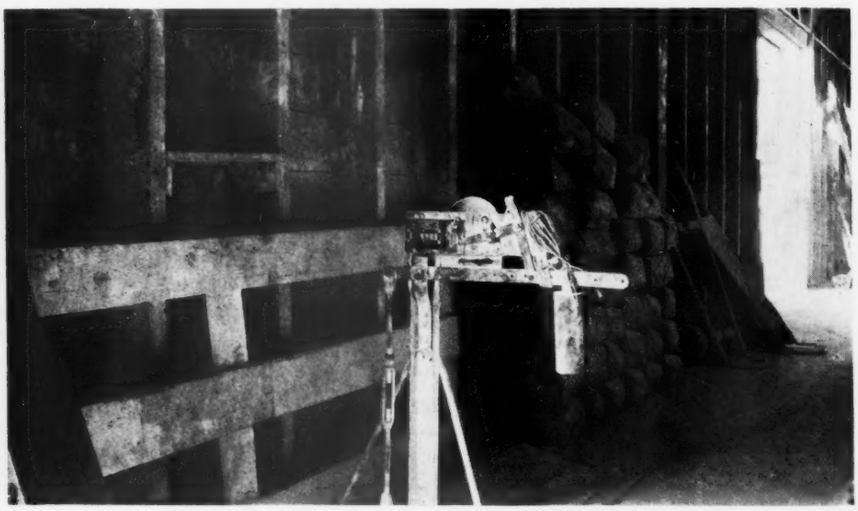
Hints and Helps for Superintendents

Device for Keeping Track of Lime Loaded

THE DEVICE illustrated herewith shows a "Productometer," an automatic counting, or registering, instrument quite well known to manufacturers. Its use in this particular case is interesting to all lime plant superintendents because it illustrates a simple method of keeping tabs on the amount of lime loaded out of a shipping room or shed.

By means of a counter-weighted system of levers, every time a wheel-barrow or truck is rolled over a slight elevation, or obstruction, at the entrance of the car door, the "Productometer" registers one. Thus an automatic register is kept of the number of wheel-barrow or truck loads. The adjustment of the instrument may be made sufficiently sensitive so that it will register only a loaded barrow or truck; or the empty truck need not be run over the obstruction. It is portable.

The device shown is at one of the lime sheds of the Rockland & Rockport Lime Co., Rockland, Me., of which Wm. C. Bird is general superintendent.

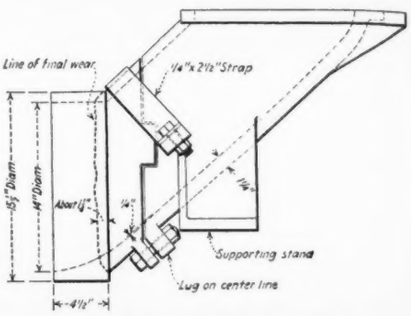


"Productometer" for keeping track of lime loaded out of storage into cars

Renewable Nose for Symons Crusher Feed Spout

By J. W. TAIT

IN CRUSHING a very hard and tough ore, the nose of a Symons crusher feed spout was worn very rapidly, being ground off on the outside by material between the nose and the outer disk. The renewable nose shown in the accompanying drawing was designed to save the waste of material caused by scrapping the body of the spout when only the nose was worn. The special features of this design are the absence of any projecting lugs inside the crusher hood, gained by the use of the ¼x2½-in. strap clamp over the top, and the key lugs in the sides of the spout which prevent any relative turning or vertical motion between the two parts. The bottom of the nose is ¼-in. thinner than the bottom of the body, so that no projection is formed at the joint to obstruct the passage of the ore. The joint between the two parts is not finished in any way, the nose castings being used as delivered from the foundry.—*Engineering & Mining Journal-Press.*

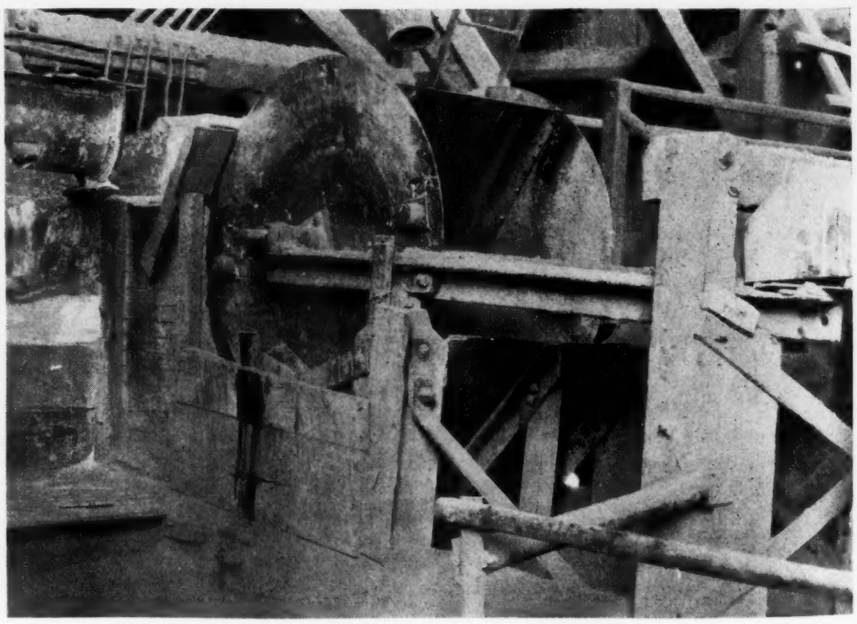


Renewable nose for disk crusher

Measuring Wheel for Adding Gypsum to Cement

THE measuring wheel, quadrant wheel or cross feeder (for it goes by all of these names) is an excellent device for feeding definite quantities of any dry pulverized material. It consists of two circular end plates with two cross partitions which divide the space between them into four equal parts of quadrant section. It can be made at the plant of steel plate or it can be purchased.

The feeder shown in the picture is a "home made" one. It is in use at a



Rotating quadrant for measuring gypsum feed to portland cement clinker

cement plant for adding gypsum to the clinker before the clinker goes to finish grinding mills.

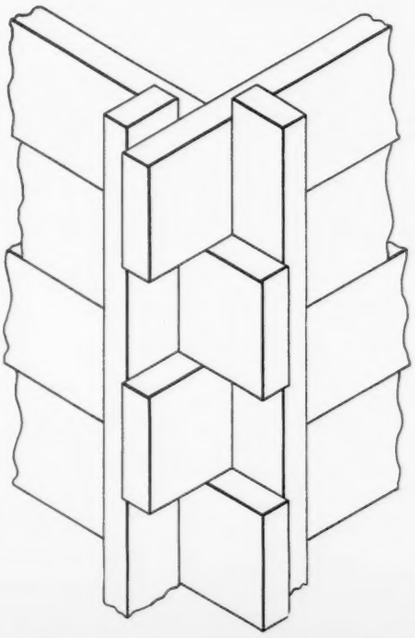
Keeping a Screen from Working Uphill

A CYLINDRICAL revolving screen running on tires and trunnions, such as are generally used in stone-crushing plants, will sometimes creep "uphill"; that is, against the inclination of the screen. This may happen from the trunnions being out of line, in which case the trouble may be corrected by lining them. But it may also come from uneven wear on tires and trunnions, in which case lining up will do nothing toward curing the defect.

The cut shows how a screen was prevented from creeping at the trap-rock plant of A. B. Cooper, Inc., at Johnstown, Penn. The screen had given considerable trouble by crowding into the chute shown in the upper part of the picture and breaking it down, and relining the trunnions did no good.

A. B. Cooper, Jr., the plant superintendent, cured the trouble quite easily by placing a car wheel where it would bear on the edge of the tire at the upper end of the screen. A piece of steel shafting of the diameter of the hole in the hub was let into the timber that supports the bearings for the screen drive and fastened in place by a bit of planting nailed to the timber. A collar on this shaft held up the car wheel at the proper height.

The arrangement and construction is clearly shown in the accompanying cut. Since it has been put on there has been no further trouble from the creeping of the screen.



Proper way to attach end pieces in bin construction

right angles to the position shown in your cut.

This position gives a better nailing area to the horizontal members that act as a tie, and in addition puts the vertical piece in its plane of greater strength to resist th bursting thrust of the bin.

The vertical member can then be made the same width as the distance of the projection of the "log cabin" ends, thus making the whole structure very much better in appearance as well as stronger.

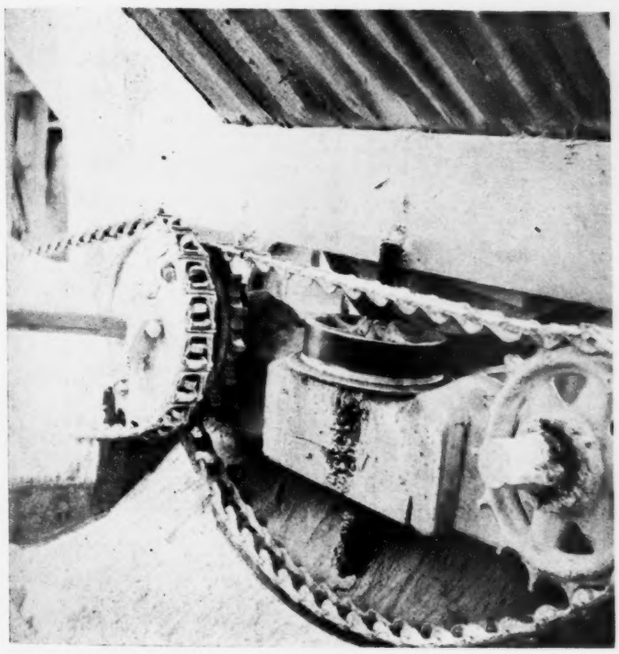
Small Home-Made Elevator

A SMALL elevator was needed to bring back the product of a 6x8-in. jaw crusher to the main plant screen. As the pieces were small the buckets did not have to be large nor of heavy metal, so as much to save time as anything the elevator was made at the plant. The chain and sprocket wheels were available, being junk that had been discarded when the plant was rebuilt.

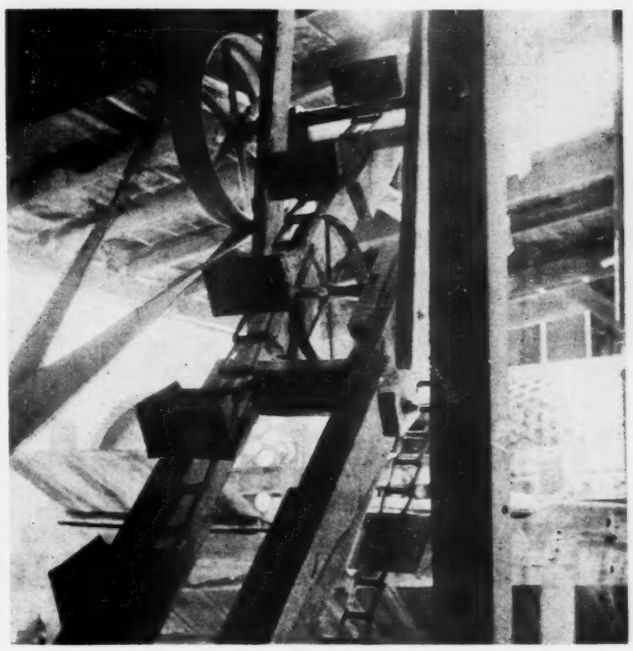
The buckets, which are about 8x5 in., were folded from 16-gage sheet steel by a local tinsmith after a pattern furnished by the plant superintendent. The frame was made of 2x6-in. timbers. For guide wheels, to hold the chain from the frame and to keep it in line old wheelbarrow wheels were used, the ends of the axles being placed in blocks which were nailed to the frame.

This little elevator has been in service for over a year and has given full satisfaction in all of that time.

Of course an elevator which had any real work to do would have to be more substantially constructed but for the purpose it has answered very well and it is an interesting example of how scrap material may be used.



Home-made device for keeping rotary screen from working uphill



Home-made elevator doing good service

Better Method of Wood Bin Construction

By IRVING WARNER

Vice-President, Charles Warner Co., Wilmington, Del.

I NOTE in the issue of Rock Products, July 26, page 51, a "Hints and Helps" article with drawing showing "Method of Building a Bin."

We have used this system very successfully and know it to be good. However, the construction is better if the vertical members, which make the tie, are set at

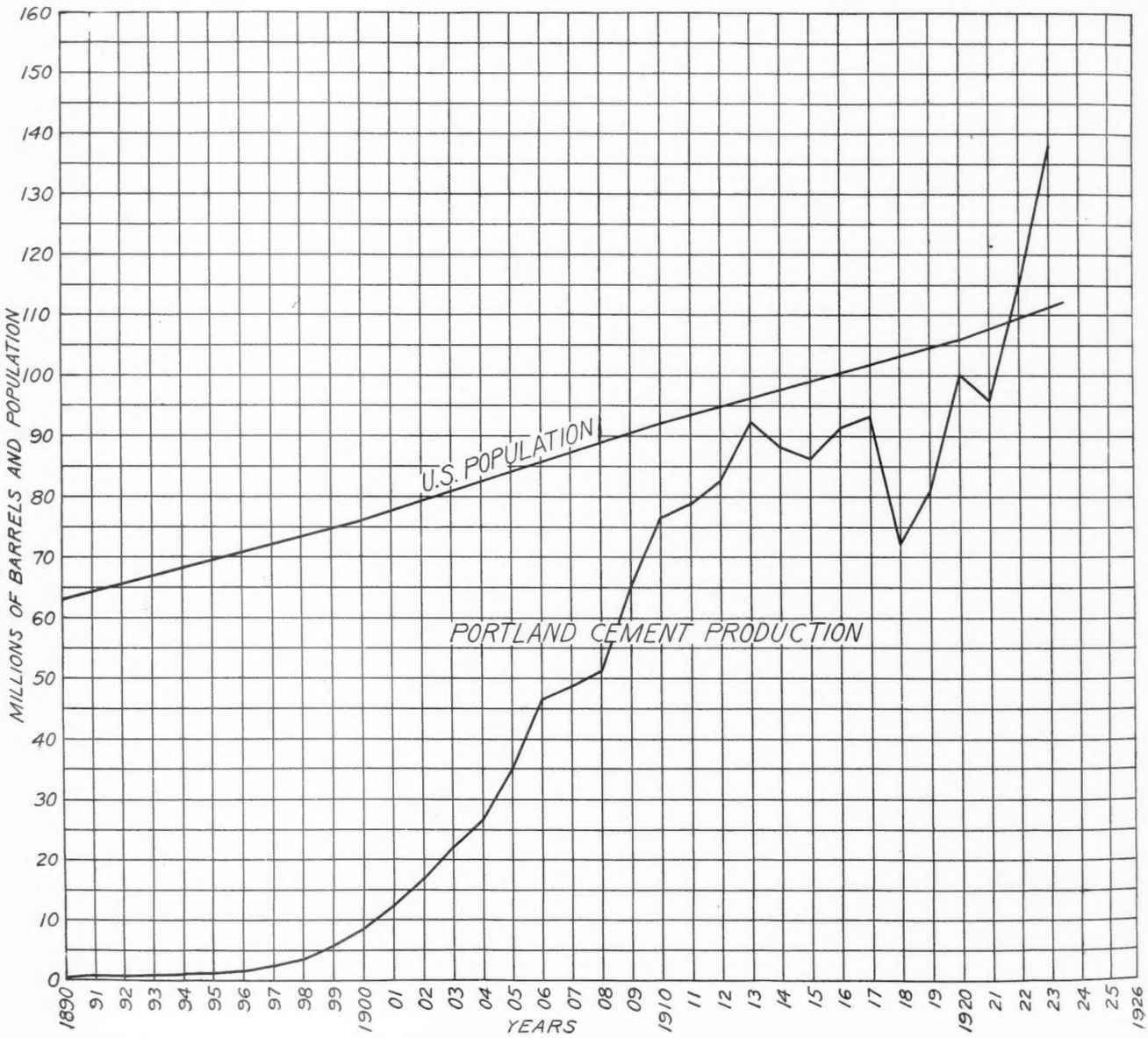
Editorial Comment

A Brief Analysis of the Portland Cement Industry

ACCORDING to statistics that the editors have gathered from the industry there are at present 133 active plants manufacturing portland cement in the United States; 13 additional plants are actually under construction; 16 more are in the process of financing or are projected, possibly a few of which have actually done some construction work.

The 133 active plants have an approximate capacity of 162,000,000 bbls. The most optimistic manufacturers do not expect production this year to exceed 150,000,000 bbls. and the present probabilities are that the figure will be nearer 140,000,000.

Of the 13 plants now under construction about half should be ready to produce before the end of the year. The capacity of these plants, according to available data ranges from 600,000 to 1,500,000 bbls. per annum each. In other words the end of the year will see the producing capacity of the portland cement industry approxi-



A comparison of the increase in population in the United States with the increase in production of portland cement

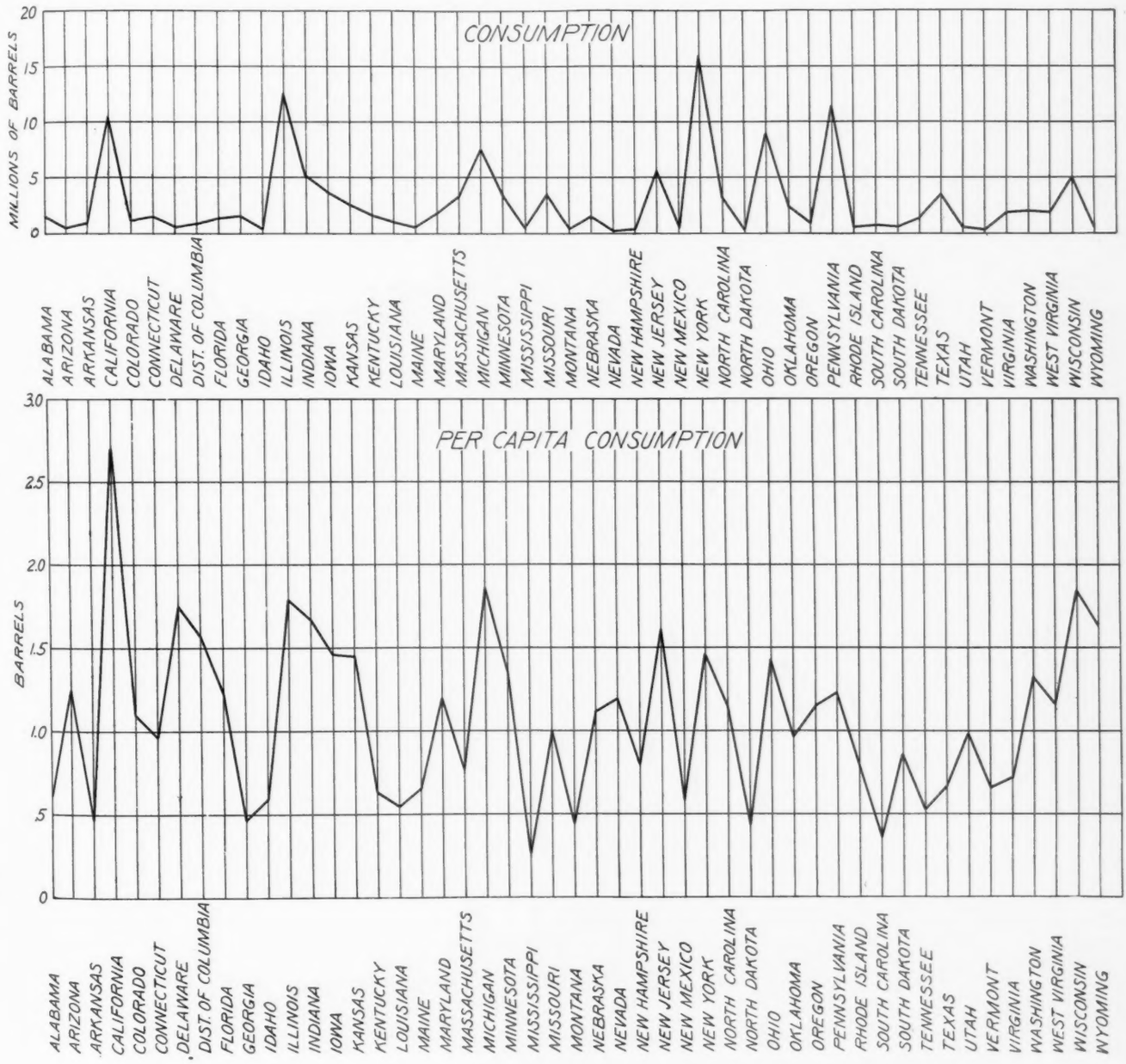
mately 170,000,000 bbls. and by the end of 1925, at least 175,000,000 bbls. from plants and plant additions already in progress.

Should the 16 projected plants materialize probably something between 10,000,000 and 15,000,000 bbls. more production would be in sight. It is obvious then that the portland cement industry is anticipating a possible production of portland cement in 1926 of approximately 185,000,000 bbls.

Remarkable Increase in Per Capita Consumption

One of the most interesting phases of the remarkable increase in portland cement production and consumption in the last five years has been the increase in per capita consumption. This is the direct result of the persistent and effective publicity and promotional work of the Portland Cement Association in seeking out and developing an ever increasing number of new uses for portland cement, as well as the remarkable gains made in the adoption of the concrete type of pavement.

In round figures approximately 50% of portland cement consumption is accounted for by public works such as highways, water-works, sewerage, etc., and big construction. The other half of the country's consumption is for the smaller stuff—concrete products, stucco, farm uses, etc. Probably it is in this latter field that we must look for the increase in per capita consumption in the future. Probably public works are going at as strong a pace today as they will go for some time, since money is cheap and all other conditions favorable, except, apparently, a misinterpretation of the increasing agitation for an era of greater economy in government.



Consumption of portland cement by states and per capita consumption by states—1923 statistics

Prospective Productive Capacity

The graph below shows present (1923) production by districts and productive capacity already under construction, and productive capacity projected. It will be seen that this new productive capacity is fairly well distributed throughout all the districts, the larger increases being in California and Michigan.

It is interesting to observe that these maximum projected increases in production are in the two commercial districts which already have maximum per capita consumption.

Of course per capita consumption is a rather indefinite term because it may vary greatly in the different districts from year to year. The construction of a great dam or bridge in a district which the year previous had used only four or five million barrels might increase the consumption of that district by 25 or 50%, and if the district happened to be sparsely settled like district 10 (Colorado and Utah) the per capita consumption would jump very materially.

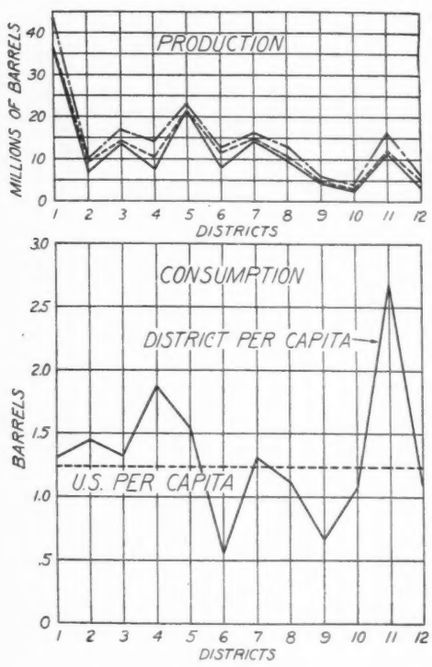
The great increase in projected production in district 4 (Michigan and Wisconsin) is evidently based on a belief that these states will continue the remarkable progress they have made and are making in concrete road building. This is surely encouraging to cement and aggregate producers in states which have not yet engaged in extensive programs of concrete road building.

The same holds true in the case of California (district 11) although here great harbor and industrial works at Los Angeles and Oakland, and tremendous hydroelectric power projects also add appreciably to the per capita consumption.

On the whole, the graphs below show that the proposed increases in productive capacity are pretty well distributed over the country as a unit without consideration of the present per capita consumption of the various districts and the possibilities of increasing per capita consumption in those districts which appear, on the face of it, to be below normal.

One thing these graphs should do (if the necessity exists for doing so) is to convince portland cement manufacturers of the success of their joint promotional efforts through the Portland Cement Association, and to prove to them and every rock products producer as well, the priceless value to them of an organization which consistently and persistently, year in and year out, is developing and exploiting new uses for their material. Such an organization is the greatest stabilizing influence an industry can have and we venture to say that without it, and production increasing as it has, the conditions in the portland cement industry today would be chaotic.

It is also evident from the data assembled here that there is small chance of portland cement production in this country lagging behind the demand; while experience in 1913 and 1914 proves that the upward trend of the curve of production is not necessarily bound to continue without a break.



The upper graph shows present (full line); under construction (dotted line) and projected production of portland cement in each of the U. S. Geological Survey commercial districts. The lower graph shows the per capita consumption of these same districts in 1923. The numbers refer to the districts in order as shown in the table to the right

ESTIMATES OF PRODUCTION, SHIPMENTS, VALUE, AND STOCKS OF FINISHED PORTLAND CEMENT IN 1923, BY STATES—(SUBJECT TO REVISION)

State	Active Plants	Production, Barrels	Shipments—Barrels	Shipments—Value	Stocks Dec. 31, Barrels
Alabama	5	3,471,000	3,395,000	$6 200,000	137,000
California	9	11,490,000	11,394,000	27,400,000	350,000
Illinois	4	7,149,000	7,032,000	12,500,000	642,000
Iowa	5	5,732,000	5,572,000	10,600,000	952,000
Kansas	7	6,057,000	5,859,000	11,000,000	769,000
Michigan	14	7,507,000	7,448,000	14,300,000	710,000
Missouri	5	7,276,000	7,137,000	13,600,000	724,000
New York	9	6,966,000	6,853,000	12,900,000	653,000
Ohio	6	4,189,000	4,003,000	7,600,000	347,000
Pennsylvania	22	37,768,000	38,274,000	70,400,000	2,077,000
Texas	5	4,180,000	4,075,000	8,200,000	278,000
Washington	4	2,091,000	2,111,000	4,900,000	241,000
Other States*	31	33,501,000	32,734,000	62,400,000	2,695,000
	126	137,377,000	135,887,000	$262,000,000	10,575,000

*Including Colorado, Georgia, Indiana, Kentucky, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, Tennessee, Utah, Virginia, and West Virginia.

ESTIMATES OF PRODUCTION, SHIPMENTS, VALUE, AND STOCKS OF FINISHED PORTLAND CEMENT IN 1923, BY DISTRICTS—(SUBJECT TO REVISION)

Commercial District	Active Plants	Production, Barrels	Shipments—Barrels	Shipments—Value	Stocks Dec. 31, Barrels
Eastern Pa., N. J., and Maryland	22	35,359,000	35,795,000	$65,900,000	1,832,000
New York	9	6,966,000	6,853,000	12,900,000	653,000
Ohio, Western Pa., and West Virginia	11	13,469,000	13,215,000	24,500,000	1,061,000
Michigan	14	7,507,000	7,448,000	14,300,000	710,000
Illinois, Indiana, and Kentucky	10	21,198,000	20,961,000	38,100,000	1,549,000
Virginia, Tenn., Alabama, and Georgia	11	7,879,000	7,610,000	14,000,000	457,000
Eastern Missouri, Iowa, and Minnesota	10	14,005,000	13,618,000	25,700,000	1,855,000
Western Mo., Neb., Kans., and Okla.	11	9,810,000	9,557,000	18,300,000	1,143,000
Texas	5	4,180,000	4,075,000	8,200,000	278,000
Colorado and Utah	5	2,441,000	2,338,000	5,300,000	269,000
California	9	11,490,000	11,394,000	27,400,000	350,000
Oregon, Washington, and Montana	9	3,073,000	3,023,000	7,400,000	418,000
	126	137,377,000	135,887,000	$262,000,000	10,575,000

In platting the graphs opposite, the proposed plant in Maine has been assigned to the New York district (2); the new Wisconsin plant to the Michigan district (4)

Portland Cement Output for Month of July, Record for All Time

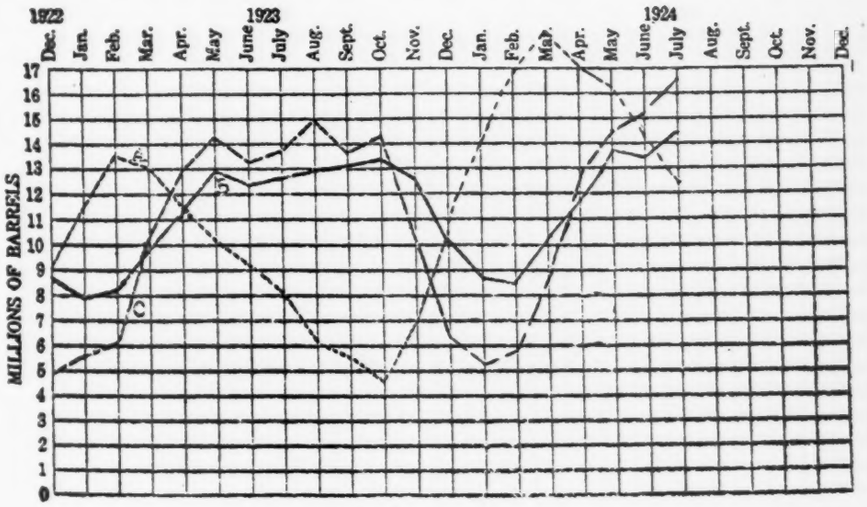
THE statistics shown in the following tables issued by the Department of the Interior, and prepared under the direction of Ernest F. Burchard, of the Geological Survey, are based mainly on reports of producers of portland cement but in part on estimates. The estimates for July, 1924, were made necessary by the lack of returns from two plants. Production and shipments for the month are the highest on record, and stocks though decreasing rapidly since March, 1924, are greater than at the corresponding season of any earlier year.

Stocks of clinker, or unground cement, at the mills at the end of July, 1924, amounted to about 6,646,000 bbl. compared with 7,609,000 bbl. (revised) at the beginning of the month.

The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, reports that the imports of hydraulic cement in June, 1924, amounted to 196,655 bbl., valued at $283,112. The total imports in 1923 amounted to $1,678,636 bbl., valued at $2,964,098.

The imports in June were from Belgium, 116,069 bbl.; Norway, 40,457 bbl.; Denmark, 31,276 bbl.; England, 3497 bbl.; Sweden, 3080 bbl.; Germany, 1782 bbl.; France, 488 bbl.; Canada, 6 bbl. The imports were received in the following districts: Los Angeles, 62,565 bbl.; Porto Rico, 34,398 bbl.; Philadelphia, 33,517 bbl.; Florida, 24,163 bbl.; New Orleans, 11,701 bbl.; Massachusetts, 10,104 bbl.; San Francisco, 7316 bbl.; New York, 4986 bbl.; Washington, 4891 bbl.; Oregon, 3002 bbl.; other districts, 12 bbl.

The exports of hydraulic cement in June, 1924, were 74,064 bbl., valued at $229,852, of which was sent to South America, 33,750 bbl.; Cuba, 18,909 bbl.; to the other West Indies, 6543 bbl.; Mexico, 9502 bbl.; Central America, 2846 bbl.; Canada, 1249 bbl.; and to other countries, 1265 bbl.


1922
1923
1924
Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
MILLIONS OF BARRELS
17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
A
B
C

Portland cement production, stocks and shipments. (A) Stocks of finished portland cement at factories. (B) Production of finished portland cement. (C) Shipments of finished portland cement from factories

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN JULY, 1923 AND 1924, AND STOCKS IN JUNE, 1924, IN BARRELS

Commercial district	Production—July 1923	Production—July 1924	Shipments—July 1923	Shipments—July 1924	Stocks at end of July 1923*	Stocks at end of July 1924	Stocks at end of June, 1924*
Eastern Penn., N. J. & Md.	3,216,000	3,418,000	3,484,000	4,205,000	2,814,000	2,734,000	3,521,000
New York	654,000	718,000	730,000	962,000	655,000	784,000	1,028,000
Ohio, Western Penn. & W. Va.	1,284,000	1,503,000	1,442,000	1,955,000	762,000	1,188,000	1,639,000
Michigan	783,000	1,058,000	895,000	1,100,000	320,000	529,000	571,000
Wis.,† Ill., Ind. & Ky.	1,817,000	2,166,000	1,848,000	2,570,000	497,000	1,953,000	2,356,000
Va., Tenn., Ala. & Ga.	626,000	962,000	583,000	1,109,000	234,000	606,000	753,000
E'n Mo., Ia. & Minn.	1,259,000	1 333,000	1,544,000	1,633,000	1,014,000	2,110,000	2,410,000
Western Mo., Neb., Kans. & Okla.	956,000	935,000	1,062,000	993,000	873,000	1,137,000	1,195,000
Texas	397,000	409,000	411,000	442,000	187,000	264,000	298,000
Colo. & Utah	256,000	273,000	276,000	293 000	159,000	167,000	188,000
California	1,083,000	986,000	1,069,000	1,025,000	169,000	326,000	365,000
Ore., Wash. & Mont.	289,000	268,000	368,000	327,000	397 000	520,000	579,000
	12,620,000	14,029,000	13,712,000	16,614,000	8,081,000	12,318,000	14,903,000

*Revised. †Began producing, June, 1924.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS*

Month	Imports 1923	Imports 1924	Exports 1923	Exports 1924
January	71,686	153,732	74,169	88,586
February	20,529	162,930	88,531	62,606
March	66,521	160,517	98,861	91,224
April	76,899	148,138	85,662	83,200
May	88,480	161,304	103,634	88,850
June	111,559	196,655	77,203	74,064
July	286,106	(‡)	82,774	(‡)
August	324,008	.....	73,201	.....
September	215,785	.....	77.121	.....
October	172,051	.....	74,302	.....
November	140,590	.....	85,743	.....
December	104,422	.....	80,487	.....
	1,678,636	.....	1,001,688	.....

*Compiled from records of the Bureau of Foreign and Domestic Commerce.

‡Imports and exports in July, 1924, not available.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS

Month	Production 1923	Production 1924	Shipments 1923	Shipments 1924	Stocks end of Month 1923*	Stocks end of Month 1924
January	*7,990,000	8,788,000	*5,628,000	5,210,000	11,477,000	*14,155,000
February	*8,210,000	8,588,000	*6,090,000	5,933,000	13,596,000	*16,815,000
March	9,880,000	10,370,000	10,326,000	8,995,000	13,045,000	*18,189.000
First Quarter	26,080,000	27,746,000	22,044,000	20,138,000	.....	.....
April	11,359,000	11,726,000	12,954,000	12,771,000	11,463,000	*17,159,000
May	12,910,000	13,777,000	14,257,000	14,551,000	10,144,000	*16 403,000
June	12,382,000	13,538.000	13,307,000	15.036,000	9,168,000	*14,903,000
Second Quarter	36,651,000	39,041,000	40,518,000	42,358,000	.....	.....
July	12,620,000	14,029,000	13,712,000	16.614,000	8,081,000	12,318.000
August	12,967,000	.....	14.971,000	.....	6,080,000	.....
September	13,109,000	.....	13,698,000	.....	5,533,000	.....
Third Quarter	38,696,000	.....	42,381,000	.....	.....	.....
October	13,350,000	.....	14,285,000	.....	4,612,000	.....
November	12,603,000	.....	10,251.000	.....	6,991,000	.....
December	9,997,000	.....	6,408,000	.....	10,900,370	.....
Fourth Quarter	35,950,000	.....	30,944,000	.....	.....	.....
Preliminary Total	137,377,000	.....	135,887,000	.....	.....	.....
Amt. of under est.	83,238	.....	25,118	.....	.....	.....
Final Total	137 460,238	.....	135,912,118	.....	.....	.....

*Revised.

International Cement Expands

IT IS estimated that the International Cement Corporation has increased the capacity of their plants by 1,300,000 bbls. so far this year. At the end of 1923 the yearly capacity was 5,400,000 bbls. This brings the total up to 6,700,000 bbls. at the present time.

Third kilns have been installed in the Houston, Texas, and Cuban plants, which are working at capacity. The Kansas plant, following its enlargement, has been operating for two weeks and satisfactory reports have been received by local officials. The property purchased at Norfolk this spring has been surveyed by the company's employes and other preliminary work such as acquirement of office building, etc., will immediately be started. It is hoped to start operations there this fall.

The directors met for dividend action Thursday, August 21. The cement company reported net income of $442,013 for the quarter ended March 31, last, which was equivalent, after preferred dividends to $1.14 on the 364,167 shares of no par value outstanding. The report for the three months ended July 30, 1923, showed net income of $636,710, equivalent to $1.67 a share on the common.—*The Wall Street News (New York City).*

For the scond quarter of 1924 net income was $678,290, after taxes, against $636,710 for the same quarter of 1923. This was equal after preferred dividends to 11.69 a share on $364,167 common shares, against $442,013, or $1.04 a share in the last preceding quarter, and $1.67 a share in the June (1923) quarter.—*Chicago News.*

American Cement in Venezuela

By CONSUL HENRY J. ANSLINGER, La Guiara

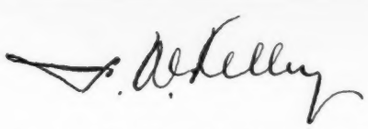
AMERICAN cement is preferred to other foreign makes in La Guiara and constitutes the bulk of the imports of this commodity, even though the German, British and Scandinavian products cost $1 less per barrel.

According to the latest available statistics in 1922 Venezuela imported 11,500 metric tons of cement, of which 7,714 tons came from the United States. The nearest competitor was Germany with 2500 tons. Great Britain, the Netherlands, and Sweden supplied the remainder.

Cement continues to arrive in large quanties, principally for use in road construction. Nearly every incoming vessel brings about 1000 barrels. The superiority of American cement over the product of other foreign countries is evidenced in price, quality, and packing. Although the price is obviously a deterrent factor, and hinders a greater importation of American cement, quality can always be relied upon. The salient advantage of American cement is its packing. If 1000 barrels of American arrive on an incoming vessel, not one will be broken in unloading, due to steel bands and reinforced heads. If, however, 1000 barrels of German, British or Scandinavian cement arrive, about 25% of the barrels may be broken open in handling and unloading. This condition is naturally reflected when the cement finally arrives at the point of construction. American cement, therefore, although much higher in price, is more economical, its quality and packing making up for the favorable difference in the price of other foreign competitors.

F. W. Kelley Represents American Portland Cement Manufacturers at Centennial

F. W. KELLEY, president of the Portland Cement Association, and president of the Helderberg Portland Cement Co., Albany, N. Y., sailed from New York City, August 5, to officially represent American portland cement manufacturers



at an international convention of manufacturers in London, England, early in September, at a celebration of the 100th anniversary of the invention of portland cement.

Mr. Kelley will visit and make a study of many cement plants in England and on the continent to compare American and foreign practices and methods of manufacture.

Among those sailing on the Aquitania for England on August 27 were William M. Kinney, general manager of the Portland Cement Association and a number of officials of leading portland cement companies in the country. This party will participate in the celebration being held by the British Cement Makers' Federation in commemoration of the one hundredth anniversary of the invention of portland cement.

An important feature of the centenary celebration will be the unveiling and presentation by F. W. Kelley, president of the American Portland Cement Association, of a bronze memorial tablet presented to the British Cement Makers' Federation in memory of Joseph Aspdin of Leeds, the bricklayer who invented portland cement. This ceremony will take place in the city hall of Leeds, England, in the presence of the Lord Mayor of the city, other city officials and visiting cement makers' representatives coming from various parts of the world to attend the celebration.

While in England the representatives of American cement companies will visit a number of British cement plants and inspect many concrete structures representative of the first usage of portland cement, and some of Great Britain's concrete roads, the mileage of which has been increasing rapidly during the past two or three years.

A point of outstanding interest will be the British Empire Exhibition at Wembley Park, London, one of the largest affairs of its kind ever arranged, and of particular interest because the exposition buildings represent the most imposing group of reinforced concrete structures ever erected in a single project. The buildings are to be maintained permanently at Wembley by the British government.

The centenary celebration will close September 10.

Missouri Portland Cement Stock in Demand

MISSOURI PORTLAND CEMENT was in good demand at unchanged price at the session of the St. Louis Stock Exchange July 17. All the sales were made at $100 and more wanted at those figures and at the close offered at $100.37½. Sales were made daily at $100 since July 14.

Least Unemployment in Cement Industry

CURTAILED production during recent months has caused some unemployment in nearly every industry. But of all groups of workers, those engaged in producing materials for construction have suffered the least. As compared with a year ago more workers are being kept busy in the cement industry than in any other. Lumber workers have fared the next best, with only a 2.4 per cent reduction from employment figures of 12 months back. Iron and steel employment has declined 4.4 per cent.

Textile workers, boot and shoe workers and those making tires have suffered considerably but at the lowest pitch of all is the agricultural implement industry, with foundry workers not far behind.

Illinois Quarrymen Sell Agstone Through Farm Bureaus

AFTER a long period of negotiation, the phosphate-limestone department of the Illinois Agricultural association, representing the county farm bureaus of Illinois, reached an agreement with the quarry companies of the state, according to an announcement coming to Melvin Thomas, farm adviser of Coles county.

The largest quarry companies have agreed to the plan advocated by the Illinois Agricultural association, which gives recognition to the county farm bureaus and provides an inside price by means of a discount certificate furnished to each purchasing farm bureau member. Accordng to this plan farm bureau members in Coles county who buy limestone will get their discount certified upon application to the farm bureau office.

It is conservatively estimated that the annual savings to farm bureau members, through the reductions that have been made in the general price level and through the special discount certificates for farm bureau members will amount to $60,000 as a direct result of the plan.

With the relationship between the quarry companies and the farm bureaus the best it has ever been and with the price of limestone in most parts of the state at a favorable figure for the farmers, it is predicted that 1924 may break the record for amount of agricultural limestone used in Illinois.—*Mattoon (Ill.) Journal.*

Agricultural Limestone Making Big Gains in Iowa

IN JACKSON COUNTY, Iowa, a limestone and legume tour arranged by County Agent Ben Walker definitely demonstrated to farmers, bankers, merchants and county agents from five counties every step in limestone production from the quarry to prime beef.

The final consumption of the increased production caused by limestone was well demonstrated at the farm of Frank Coverdale. Mr. Coverdale has been the pioneer in the production of sweet clover in eastern Iowa. The crowd gathered in a 20-acre field of sweet clover on ground that had been limed 12 years before.

It was an inspiring sight to everyone to see the 43 head of 1100-lb. steers feeding in the sweet clover field. The 43 steers had been on 20 acres of sweet clover and 20 acres of bluegrass during the past spring.

Can See 'Em Fatten

Mr. Coverdale stated that he cut 1½ tons of sweet clover hay from his sweet clover field last year, fed it to the steers last winter and that they had been on the sweet clover pasture all this year.

Mr. Coverdale has been raising sweet clover for the past 25 years and believes it is the greatest soil-builder, and pasture that can be grown. Mr. Coverdale emphasized the importance of using lime for sweet clover and then handling the crop properly to secure the most profitable returns. Sweet clover must be kept down to make good pasture and this will often require two or three head of cattle per acre during June.

A brief stop was made at Hurstville where limestone was being quarried from the original beds, crushed and pulverized. A great deal of limestone has been hauled from this quarry during the past few years and many fields of alfalfa are being grown as a result of the lime produced from this quarry.

On the L. P. Kier farm the portion of the field from South Dakota seed had given a very much heavier yield and was further advanced at the time the field was examined. Last year Mr. Kier harvested approximately five tons of hay per acre from the field. He used most of it as feed for his dairy cows. The field was limed before he sowed the alfalfa seed.

At Baton Brothers a five and a half acre field of five year old Grimm alfalfa was examined. According to Mr. Beaton, this field had given him a return of from $60 to $75 an acre each year for the past four years by marketing the alfalfa hay in the form of prime beef steers. J. A. Martin obtains three or four tons an acre.—*Des Moines (Iowa) Register.*

Reported Costs of Producing Ground Limestone on the Farm

EIGHT IOWA FARMERS who replied to an inquiry reported quarrying costs ranging from 25 to 93 cents per ton, with an average cost of 60 cents per ton. Six of them reported cost of 50, 60 or 75 cents. The quarrying was done in some cases by hand and in other cases by drilling and blasting. In Missouri 40 crushers reported an average cost of 67 cents per ton for quarrying.

On the basis of these figures the average cost of quarrying should be from 60 to 70 cents a ton.

Estimated costs of grinding as reported by nine Iowa farmers averaged $1.11 per ton. The average cost of grinding as reported by operators of 40 crushers in Missouri is $1.11 per ton, to which is added 27 cents per ton for overhead on crusher to cover repairs and depreciation. This makes a total cost for grinding of $1.38 per ton.

"We do not advise that a local plant (limestone pulverizer) be established nearer than 3½ miles to a railroad station, although in some cases this figure may be modified one way or the other."

"Where a farmer has a haul of more than three miles from his railroad station, it is more economical for him to pulverize limestone on his own farm, providing he has the rock."

"Our present plan is to get a community to take so many hundred tons of limestone and then get a man to go into the custom crushing."

"We find farmers can pulverize stone for around $1.25 to $1.50 per ton but it will cost $1.00 more as an average, for the different kinds of quarrying we have to do."—*Manchester (Iowa) Democrat.*

New Iowa Quarry Company

ARTICLES of incorporation for the Dubuque Stone Products Co. were filed with the county recorder here recently. The concern is capitalized at $75,000. The officers are T. J. Mulgrew, president; Russel Mulgrew, vice-president, and A. F. Schrup, secretary-treasurer.

The company will manufacture crushed stone, supply fertilizer for farm uses, will engage in street and road contract work, and later will manufacture lime.

Several years ago the old Moore's mill property and some other property in the neighborhood was purchased with the idea in mind that should the demand for crushed rock continue to increase, the site would be ideal for a plant. All the property is located east of South Locust street and extends to the Illinois Central line.

T. J. Mulgrew, president of the new concern, declared that work of preparing the ground for the installation of machinery would be started soon and that production probably would be started by next spring. It will take about six months to prepare the site and erect machinery and construct railroad tracks.

The plant will be equipped with one No. 8 and two No. 5 gyratory crushers as well as pulverizers for the manufacture of fertilizer. It will have a capacity of 1000 tons of crushed stone daily.

From the standpoint of economy in production, the plant will probably be one of the foremost in the country. With a 250-ft. "face" it is planned to blast out a ledge about 100 ft. above the lowest level on which will be located the crushing plant. It is pointed out that the stone will be handled almost entirely by gravity, cutting down the cost of handling to a minimum.—*Dubuque (Iowa) Herald.*

Florida Phosphate Shipments Picking Up

SHIPMENT of phosphate from the port of Boca Grande, Fla., last month amounted to 47,563 tons, according to figures furnished F. L. D. Carr, chairman of the water commerce bureau, the Tampa Board of Trade, by P. P. Speer, terminal agent at Boca Grande.

This is the largest amount of any month this year except April, when 59,554 tons were shipped through that port. Of the July movement, eight vessels carried 23,641 tons to foreign ports, and five ships took 23,632 tons coastwise.

Sand and Gravel Sold in 1923

THE sand and gravel sold in the United States in 1923 amounted to 139,932,153 short tons and was valued at $90,903,654, according to reports made by the producers to the Department of the Interior through the Geological Survey. These figures show an increase of about 48% in quantity and 41% in value over those for 1922. There was a general increase in both the quantity and the value of all classes of this material sold except in the value for filter sand. A special canvass of railroad companies was made in 1923 in order to obtain more complete reports of non-commercial material used by them, and the figures obtained make up in part the large increase (146%) shown in the quantity of gravel used for railroad ballast. The sale of sand and gravel for use in the construction of buildings and pavements also showed a large increase. The figures for 1923 include returns obtained from 2428 sand and gravel plants, which is 443 more than the number represented by the figure for 1922. The quantity and the value of the different grades of material produced in 1922 and 1923 are shown in the accompanying table.

SAND AND GRAVEL SOLD IN THE UNITED STATES IN 1922-1923

	1922		1923	
	Short tons	Value	Short tons	Value
Sand—				
Glass	1,768,549	$ 2,866,366	2,034,958	$ 3,751,778
Molding	3,839,116	4,478,405	5,559,644	6 730,417
Building	29,375,466	17,574,579	39,234,762	23,751,244
Paving	10,669,772	6,481,601	15,632,419	9,187,468
Grinding and Polishing	1,183,161	1,732,469	1,456,039	2,361,695
Fire or Furnace	237,065	336,085	307,794	445,479
Engine	1,685,712	1.288,022	2,033,494	1,535,638
Filter	71,728	142,692	116,520	139,671
Other	864,354	569,701	989,641	570,175
Total	49,694,923	$35,469,920	67,365,271	$48,473,565
Gravel—				
Building	18,686,176	14,541,169	24,145,463	18,367,713
Paving	17,432,445	11,373.712	26,174,112	17,716,779
Railroad Ballast	9,053,502	3,232,863	22,247,307	6,345,597
Total	45,172,123	$29,147,744	72,566,882	$42.490,089
Grand total	94,867,046	$64,617,664	139,932,153	$90,903,654

Buffalo Sand Producers Contend Over River Deposits

JUSTICE BRENNAN in special term of supreme court on August 4 reversed decision on two motions of Senator Parton Swift, counsel for the Holloway Sand Co., who opposed the continuation of the injunction restraining the company from dredging sand and gravel near Squaw island near the international bridge and the proposed punishment of the company for alleged violation of the injunction.

Last February the Squaw Island Freight Terminal Co. began action against the Holloway company charging that they were poaching on their grounds. Last week they procured a temporary injunction against the Holloway company and yesterday was the return date when the defendant company was to show cause why the injunction should not be continued.

Charles J. Newton, former attorney general, and James W. Riley, attorney for the plaintiff, said that they had affidavits to show that the Holloway company had taken 380 cu. yd. on July 28, thereby lowering the level of the land 2 ft. This occurred after the temporary injunction had been granted by Justice Pierce, it was claimed.

The object of the contempt proceedings of the plaintiff firm is to force the Holloway company to return to them the sand and gravel which they are alleged to have taken that day and other days, supposedly in violation of the restraining order.

Senator Swift said that the Squaw Island company had made a similar attempt to put his client out of business in 1921.—*Buffalo (N. Y.) Express.*

Justice Brennan has appointed Maulsby Kimball to referee the dispute.

Counsel for the terminal company brought a second charge of violation of the temporary injunction order granted by Justice Pierce a week ago restraining the Holloway people from excavating sand and gravel in the waters between the shore line and the bulkhead line near Squaw Island. The second application is particularly aimed at employes of the Holloway Co., counsel for the terminal company alleging a captain of a barge violated the terms of the enjoining order.

Counsel for the Holloway Sand Co. denied the company violated any trespass laws and asserted the company is within its rights to remove gravel from the beds of the channel. The other side charged that operations of the sand company increased the danger of erosion of the island, and that damage amounting to $30,000 had already been done. —*Buffalo (N. Y.) Express.*

Two Men Killed by Lightning at Indiana Gravel Plant

FRIDAY, August 8, a terrific wind and electrical storm passed over southern Indiana. Among other casualties William E. Erwin, age 50, and Russel Steinbaugh, age 21, both of Lafayette, were killed and eleven other men, all employes of the Western Indiana Gravel Co., suffered from shock by lightning, struck a large steam shovel and derrick under which the men had taken refuge from the storm. Storms have done considerable damage at rock products plants this year.

Signal Mountain Cement Company to Build Big Sand and Gravel Plant

AN APPLICATION for a charter of incorporation was filed July 31 in the county clerk's office, Chattanooga, Tenn., by the Signal Mountain Sand and Gravel Co., capitalized at $250,000, which will be controlled by the Signal Mountain Portland Cement Co. The charter provides that 250,000 shares of common stock at par value of $1 each shall be issued. Practically all the capital will be invested in a plant and equipment for the new concern, according to statements made by officials of the parent organization.

The new plant will be modernly equipped in every detail and the storage facilities will be larger than those of any other company engaged in the same business in Chattanooga at present. A. C. Deer, manager of the Signal Mountain Portland Cement Co., who is in charge of the preliminary plans for the erection, equipment and operation of the plant, declined to announce the exact location which has been selected, but declared that the new industry will be situated at a point where its supply of sand, gravel and other products will not be endangered by flood waters from the Tennessee river.

The plant will be equipped with large cranes and operate under what is known as a crane storage system. A boat and several barges will be purchased and the sand and gravel taken from various points along the Tennessee river. According to the charter, which was prepared by the law firm of Williams & Frierson, the company will operate "for the purpose of conducting the business of dealing in sand, gravel, crushed stone, cement, concrete products and other building materials." The downtown offices of the organization will be located in the James building.

Heretofore the Signal Mountain Portland Cement Co.'s customers have purchased their sand and gravel from the Dixie Sand and Gravel Co., controlled by the former concern's principal competitor, the Dixie Portland Cement Co. With the opening of the new plant, practically all the demand for this product from points in Tennessee and adjoining states received by the parent firm, will be filled by the Signal Mountain Sand and Gravel Co.

Mr. Deer said that the location of the site and plans for the erection and equipment of the plant, will be announced soon.

The incorporators are John L. Senior, president of the parent company; C. S. Steward, active vice-president; J. L. Caldwell, vice-president; J. P. Hoskins, treasurer; W. A. Sadd, president of the Chattanooga Savings Bank and a member of the board of directors of the parent organization, and F. A. Stephenson.—*Chattanooga (Tenn.) Times.*

Dispatches say the Signal Mountain Cement Co. will nearly double the output of its cement mill by construction of a new unit.

Interstate Sand and Gravel Company of Indiana Plans Expansion

THAT within the next year Covington, Ind., will have probably the largest and also the most modernly equipped sand and gravel plant in the Middle West is now an assured fact. H. L. McGurk, president of the Interstate Sand and Gravel Co., with plants at Covington, Montezuma and Terre Haute, was in this city recently making the final arrangements for this great industry. He had returned from Indianapolis and Ohio, where he purchased machinery and is having the final plans drawn for the plant.

It will be modern in every detail. Every piece of machinery, even including the huge shovel, will be driven by electricity, secured from the high line coming from the superpower plant at Terre Haute. A huge pump with a capacity of 1800 gal. per minute was purchased to supply the water for washing the gravel. The capacity of the plant will be 75 cars per day, nearly four times the capacity of the present plant.

This plant will be operated in conjunction with the Big Four railroad pit which adjoins the present property of the Interstate. Over 100 acres of gravel of the finest quality is included in the property. The railroad company will receive ballast from the plant.

Mr. McGurk stated to a representative of *The Friend* that construction work would begin at once. He has secured the services of an engineer who has drawn the complete plans in accordance with the latest and most improved ideas in sand and gravel production. A vast amount of labor will be required to put the new plant in operation, but it is thought that everything will be in readiness for the opening in the spring.

The old plant will be torn down and the switch track leading to it will be taken up. One of the other tracks leading into the Big Four pit will also be removed, eliminating two of these switch tracks where they cross the Dixie highway. Mr. McGurk has been in consultation with the chief engineer of the state highway commission trying to devise some plan to make a safer and easier crossing over the line which will lead back to this new plant.

This industry could not have been secured for Covington had it not been for the fact that abundant electric power was available. Mr. McGurk said that steam equipped plants were now becoming obsolete and that he would never have undertaken the project, if electric power had not been available. An investment running into the hundreds of thousands of dollars is entailed and a vast amount of money will be expended for labor, both in the building and the operation of the plant.

It goes without saying that the people of Covington will take great pride in this new industry. Covington sand and gravel is known the world over and it has been proven beyond doubt that washed gravel of the quality that comes from our plants, is the best material yet found for constructing cement roads and all other cement products. Our gravel resources are practically unlimited and the demand is sure to increase with the increased construction of hard roads and other public improvements. — *Covington (Ind.) Friend.*

Van Sciver Sand and Gravel Interests Expand

THE VAN SCIVER CORPORATION and associate companies, producers and distributors of sand, gravel and allied building materials in the Philadelphia territory, have announced the acquisition of the sand and gravel plants at Morrisville, Penn., formerly owned and operated by the Curtis and Hill Sand and Gravel Co. Improvements will be made immediately whereby the gravel tonnage will be increased to 5000 tons per day. Shipments from this plant are made by way of the Pennsylvania R. R. The facilities at Morrisville for the loading of trucks will be maintained.

The Van Sciver Corporation will have the exclusive sale of all the products of this modern plant, and T. P. McCue, for a number of years connected with the Curtis and Hill company, will be engaged in the sales department of the Van Sciver Corporation. —*Philadelphia (Penn.) North American.*

Wisconsin Sand and Gravel Producer Enters Quarry Business

THE Wissota Sand and Gravel Co. which operates the big plant near the new bridge at Anson, Wis., have recently purchased the limestone quarry at Elmwood. The company plans to install a large sized crushing plant to crush rock for road metal and concrete aggregate. Special attention will be paid to furnishing a high grade of fine limestone for agricultural purposes.

The quarry as it now stands has a 75-ft. vertical face and an exposed ledge 600 ft. long. The floor of the quarry lies at an elevation of 150 ft. above the new spur tracks which are now being laid.

A crew of men and teams is now stripping off the overburden and clearing trees from the upper portion of the ledge.

Plans are being drawn and specifications outlined for a complete modern plant with a capacity of 1000 tons daily.

The same organization with offices at Eau Claire which has handled the gravel and sand distribution for several years will also handle the rock business except that P. D. Southworth, former county agent for Chippewa county, has joined the organization to handle the sales work and field service.

W. A. Rowe of Eau Claire is general manager for the company and stated in an interview that the company hoped to have the new plant completed by December 1. Orders for over 300 cars for ground agricultural limestone are already on file.—*Eau Claire (Wis.) Leader.*

New Sand and Gravel Company Plans Consolidations

THE PLAN of the Consolidated Materials Corporation, Rochester, N. Y., extends beyond the establishment of new plants and the opening of heretofore untouched deposits of sand and gravel and the manufacture of concrete products most economically right at the source of supply in addition to filling the orders of contractors at the point of operation. Many little competing companies make for extravagance in any line. And the history of commerce shows that such companies grow like mushrooms in the early days of a new commodity; but the urge of doing things better, in a bigger way and consequently more economically soon sees an elimination of a large number of little companies, either through consolidation or necessity that finds no purchaser handy.

One of the main purposes of the Consolidated Materials corporation, as the name of the institution implies, will be to consolidate the better of these individual companies into the one great corporation. A large amount of capital is required in order to put through such a vast project. Well known men in this section of the state, some of them well known throughout the country, have been called in to participate in the work.

The officers and directors of the Consolidated Materials Corporation are: chairman of the board, Charles D. Newton, formerly attorney general of the State of New York; president, William H. Craig, president of the Willite Corporation of Rochester; vice-president, Judson H. Webster, retired; secretary and treasurer, George I. Viall of George I. Viall and Sons, of Rochester, and the following directors: James F. Hamilton, president of the New York State Railways and director of the Union Trust Co. of Rochester, and E. W. Foley, president of the E. W. Foley Construction Co., of New York City and Waterloo, New York.—*Red Creek (N. Y.) Herald.*

The Pearl Fishers—Or a Sand and Gravel Fish Story

THE FINDING of a pearl in the gravel being used for concrete paving was the cause of several hours delay in work at Booneville, Ind., recently. Several men quit to look for pearls. A few minutes after work started following the noon recess, Jack Abbott, city engineer, was seen to stoop over and pick up something from the gravel pile. His exclamation of surprise could be heard above the noise of the gasoline engine. "What a beauty," said Abbott, at the same time exhibiting a pure colored pearl of extraordinary size. The workmen gathered around him and then as visions of a quicker way in which to get rich struck the workmen, they laid down their picks and shovels and wheelbarrows and started to claw the gravel.

Flowery Explanation of Reduced Costs of Cut Building Limestone

IT seems that prices for Bedford, Indiana limestone in New York City are reaching new low levels.

From intimate acquaintance with some New York architects who are very fond of Indiana limestone we suspect that one very good reason for this lower price is the competition of artificial limestone made from local dolomite and portland cement—finished so that even architects can hardly distinguish it from Indiana limestone. So far as anyone knows it is equally as good a structural material as Indiana limestone; and its popularity with architects is so great that similar artificial limestone is used quite extensively not only in New York City but in Indianapolis, only a few mlies from the Bedford limestone district.

Bearing this in mind and knowing that the gathering up of Bedford limestone chips and waste to make by products is fully as costly as quarrying limestone for crushed-stone products, the following, from the Dow Service Building Reports (New York City) looks like a long-winded attempt by the cut-stone quarrymen to save their faces and stem the all-powerful tide toward the use of concrete products.

Why Indiana Limestone Prices Are Low

"Recent contracts for building stone have been awarded at prices so near the pre-war levels that curiosity as to the reasons therefore have revealed facts both strange and economically startling.

"Examples of what intensive merchandising and chemical research can do to cut high costs of building are nowhere more practically proved than in this particular branch of the building construction industry. The huge water bottles that adorn a corner in an office and the mason jar into which the housewife preserves this summer's fruit and vegetables for next winter's use are now made of limestone dust.

"The miner in the coal pit now has his life safeguarded against coal dust explosions by the use of limestone dust. The fields from which the grain and garden truck come to supply the nation's dining tables are fertilized by this same by-product which in other days had to be charged into the price for stone the builder had to pay. In those days the 'stripping' which had to be laboriously dug out by hand before the solid quarry face was bare enough to work, and laid aside as waste, now sometimes pays as much as half the quarry overhead because it finds a place in modern highway improvement work. No brick or masonry is laid today unless limestone plays a part therein because in most cement the basic element is this kind of stone.

"Investigation for this lowering price provides another reason for the change. Skilled workers' sons today show but little inclination to wield the weighty mauls and hold the shimmery chisels for other men to pound. The Greater New York Cut Stone Contractors' Association at its last joint meeting solemnly reported that the majority of the skilled stone craftsmen employed in New York City and vicinity were over 50 years of age and the apprentices available to local yards 'are negligible in quantity.' So far as members here know this condition applies similarly throughout the country, particularly in the large cities.

"Into this situation has come inventive genius which gives the craft machines, a single one of which does well the work that twelve trained men in former times could do. Carborundum wheels compete today with costly diamond studded saws to cut and shape huge blocks of stone.

"These major reasons contributing to the lower cost of stone combine to keep production steady. If building requirement sags fertilizer keeps the quarries busy. If both sag, road building now takes up the slack, and so on."

Monmouth Crushed Stone Company Difficulties to Be Settled by Sale of Plant

A PETITION will be presented in federal court in Peoria, Ill., soon by attorneys for Charles E. Lauder, trustee for the bankrupt Monmouth Stone Co., Monmouth, Ill., asking that the court set a date for the sale of the property.

The property, the petition states, is to be sold free from incumbrance. The petition is a lengthy instrument and lists the property generally. According to the trustee the stuff to be sold embraces everything needed in a modern stone quarry, and includes engines, cars, graders, quarry equipment, railroad scales, stone crushers, blacksmith tools, automobiles, trucks, pumps electric power line and equipment, railroad tracks and trucks.

The petition states that there is deposited in the Standard Trust and Savings Bank of Chicago bonds of the company amounting to $250,000. The bank is acting as depository for the bondholders including several Knox county people, who pooled their bonds and placed them in the hands of a bondholders' committee. In addition, the petition states, there are $45,000 in outstanding bonds of which the trustee has no knowledge of the holders.

Directors of the Monmouth Stone Co., in an action started in Chicago not long ago, are made defendants in a lawsuit started by one of the bondholders. The directors of the concern are being sued for letting the company get in debt for an amount greater than its capitalization. Anna Summers of Chicago is the complainant in the action against the directors.

The total amount due the bond holders and holders of the trust deed executed in April, 1922, is in excess of $360,000, the petition recites.—*Galesburg (Ill.) Mail.*

Lost Again! The Formula for Limestone Cement!

TWENTY YEARS of struggling from poor boy to prosperous nurseryman in order that he might be in position to bring into reality the dream of his youth—the making of pure marble from cement—have gone into nothingness and the secret is lost to the world, just as it had been completed.

Disclosure of the success of the experiments of Charles Nelson was made today by the widow. Lying in a shed at the nursery on Foothill boulevard, Oakland, are slabs of colored marble declared by experts to be perfect.

The making of them—the technique of the process, the proportion of the ingredients—was carried to the grave by Nelson, who died suddenly on July 17 from a fractured skull received during an argument with Dorsey Jordan three weeks before.

Final success came to Nelson a few hours before the quarrel. His last act was removing air holes from the castings, the necessary feature to make the marble perfect.

"My husband," said Mrs. Nelson, "came to this city many years ago with but 25 cents, and he fought uphill for many years. All of these years he had in his mind the formula for perfect marble, but he was never able financially until recently to give his time to inventing it.

"The day of the terrible accident he had completed his life's ambition.

"His dream has always been marble homes, constructed cheaply."—*San Francisco (Calif.) Call-Post.*

Rock Phosphate Production in South Carolina Resumed

THE Carolina Lime and Phosphate Co. has begun to mine phosphate rock in Charleston county by a process that is new to this section. A power dragline, operated by a locomotive crane, will be used. Officers of the company are optimistic about resuming operations in this section on a large scale.

For economic reasons the mining of phosphate rock in this immediate section has been limited in recent years, although there is an enormous quantity of rock available.

The Carolina Lime and Phosphate Co. has leased phosphate rock-bearing lands of the Charleston Mining and Manufacturing Co. near the Ashley river, in the Lambs neighborhood, and its officers are arranging for mining a great quantity of rock. They bespeak the co-operation of Charleston concerns interested in the purchase of rock.

The president of this company is William A. Hutchinson, the vice-president and general manager E. H. Hutchinson, and the secretary Mazyck M. Hutchinson. These men have been interested in phases of the phosphate business for years.—*Charleston (S. C.) News-Post.*

Lime Plant for Pueblo, Colorado

A NEW manufactory has been added to the long list of industries in Pueblo. It is the Pueblo Lime Co.; work on the first unit of the factory of which started a few days ago. When completed the plant will have a capacity of 1,500 tons of lime a month.

The proprietors tested the product of many quarries and at last found a lime rock near Monarch Pass with Garfield the shipping point, which tested better than 99% pure.

Having made their tests and determined on the best lime rock, they acquired rights to quarry it and purchased a full block of ground in Pueblo for the location of the factory and the lime kilns. The location is next to the Thomas-Brown Coal Co., who have offices at 325 East Eighth street, and the offices of the Pueblo Lime Co. will be in the same building as are the offices of the Thomas-Brown Coal Co.

Two of the officers and incorporators of the company are also connected with the Thomas-Brown Coal Co. The incorporators are W. N. Thomas, J. D. Thomas, W. B. Thomas and J. A. Brown. The officers are: W. N. Thomas, president and general manager; J. D. Thomas, secretary and J. A. Brown, treasurer.

W. N. Brown and J. A. Brown are sole owners of the Thomas-Brown Coal Co. J. D. Thomas was for years in complete charge of the zinc interests of the U. S. Zinc Co., and is an engineer and designer of note, having designed and built several of the smelting company's zinc plants. He is now general manager of the Pueblo Clay Products Co. and is designing the new plant of the Pueblo Lime Co. W. B. Thomas is president of the Pueblo Clay Products Co.

The company will employ a number of local men and will be in a position to supply the lime needs not only of Pueblo, but of all Colorado and New Mexico, and expect to ship into Texas and as far east as Kansas City.—*Pueblo (Colo.) Chieftain.*

Chinese Sand-Lime Brick Company Reports Growing Business

THE Yee Yick Sand-Lime Brick Co., a new brick kiln, about seven miles outside of Canton, operated along modern lines and equipped with western machinery, is supplying a large portion of the requirements of the ever increasing number of western type buildings under construction. The concern is Chinese owned and managed and has a paid up capital of $325,000. The gross sales during 1923 are reported to have been approximately $240,000. At present the plant produces 60,000 bricks daily, but with additional equipment, now being installed, it is estimated that the production will be increased to about 70,000 bricks per day. (Vice Consul M. M. Hamilton, Canton.)

Cement Producers Invoke Aid of Anti-Dumping Law

DOMESTIC PRODUCERS of portland cement, through their counsel, have filed a brief with the Treasury Department, setting forth that serious injury will result to the domestic industry unless a check is placed on importations from Denmark, Sweden, Norway and Belgium. The brief states: "It has been shown that foreign cement is being shipped into the United States at prices below those at which it is sold for home consumption in the countries of Norway, Sweden, Denmark and Belgium, and that the domestic cement industry along both coasts in the United States, and in the American possessions of Hawaii and Porto Rico, have been, are being and are likely to be seriously injured by such shipments by reason of the loss of markets, forced reduction of prices in some instances to points where profits have vanished, the closing down of mills and the operation of others far below their capacity.

"It also has been shown that the domestic supply is amply sufficient to meet all demands, and that the prices resulting from keen domestic competition have been as low as could possibly be expected if a fair return is to be realized on the capital invested.

"The premises and facts considered, it is respectfully urged, that the department proceed to make such finding and issue such instructions to customs officers under the anti-dumping act as will afford the relief sought by the complainants and prevent further injury or likelihood of injury to the cement industries along the coasts by reason of the dumping of cement into the United States from any one or all of the countries of Norway, Sweden, Denmark, and Belgium."

Good Publicity for Sand and Gravel in Los Angeles

NEWSPAPERS seem to like statistics. Here are some in the *Los Angeles Times*, furnished, we presume, by some good press agent for the San Fernando Valley Sand and Gravel Producers Association. When it is remembered that this valley is only one of several sources of sand and gravel used in Los Angeles, the figures are indeed impressive.

If the 4450 trucks that each day carry their burdens of sand and crushed rock from the great Pacoima wash of San Fernando Valley were lined up in a row they would constitute a train 26 miles in length. Each truck carries a maximum legal load. This would mean 53,400 tons each 24 hours. Practically all of this material is required in the building of a greater Los Angeles, which, according to the number of building permits being issued, means a new structure every seven minutes.

Twenty rock crushing plants supply annually this 40,000,000,000 lb. of building material, all of which is taken out of Pacoima wash—and yet the hole in the ground seemingly becomes no larger. Each winter rain or freshet seems to roll down from the mountain sides or the upper reaches of the scenic canyon enough stones and gravel to fill the vacuum. The transfer of this enormous weight, to which should be added other millions of pounds that are carried by steam and trolley cars, seems not to cause the City of Angels to change its level. The only visible change is in the height of the city's sky line.

J. S. Vrabek Joins McGann Manufacturing Company

J. S. VRABEK, formerly western sales manager at Chicago of the Sturtevant Mill Co., has accepted a place in the McGann Manufacturing Co., organization whereby he becomes sales manager, with headquarters at 50 Church street, New York City. Mr. Vrabek for seven years was Western sales manager of the Sturtevant Mill Co., having gone to the Sturtevant Mill Co. from the sales and engineering department of Alis-Chalmers Manufacturing Co. Later he formed an engineering partnership, Vrabek and Kessler. Recently, Mr. Kessler withdrew from the engineering firm to accept a position with the Acme Cement Co. Mr. Vrabek was then induced to join the McGann Manufacturing Co. organization as sales manager.

Cement Company Loses Platinum Crucibles

DEPUTY SHERIFF PHIL FICKERT is expected to return from Los Angeles today with C. E. Bowman, former employe of the Monolith Cement Co. plant at Monolith, Calif., who is alleged to have stolen six platinum crucibles valued at more than $1000 from the plant.

The big cement plant has almost closed down since the theft of the crucibles several days ago, according to the sheriff's office. The crucibles, all six of which could have been placed in a teacup, were used in the laboratory. Without them the plant could not operate properly and it is almost impossible to secure new ones immediately, officials say.

Credit for Bowman's arrest goes to the Los Angeles police department. As soon as word of the theft reached here, Undersheriff Charles Smith called the southern police and placed them on the trail. It was learned that Bowman, the suspect, had a father, mother and sweetheart in Los Angeles.

He was arrested after he is said to have pawned one of the valuable crucibles in a pawn shop for $3.

Bowman was an employe of the cement plant several months ago, working in the laboratory, according to information obtained from Monolith. He is said to have been familiar with the value of the crucibles.

The authorities were amazed, they say, when Bowman took one of the little crucibles and pawned it, as they are exceedingly scarce and would attract attention anywhere.

Bowman will face a charge of grand larceny here, according to the sheriff's office.—*Bakersfield (Calif.) Californian.*

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning August 18:

Central Freight Association Docket

8998. Crushed stone. New Paris, Ohio, to Muncie, Marion and Peru, Ind. Present, 13, 14 and 16½ cents; proposed, 80 and 90 cents and $1.10 net ton.

9001. Cruhed stone. Melvin, Ohio, to points in Ohio. Present, sixth class; proposed, to (representative points per net ton): Dayton, Ohio, 70 cents; Alpha, Ohio, 70 cents; Roads, Ohio, $1; Jackson, Ohio, $1; Black Fork, Ohio, $1.10; Monroe, Ohio, $1.10; Bloom Junction, Ohio, $1.10; Scioto Furnace, Ohio, $1.10; Sciotoville, Ohio, $1.10; Portsmouth, Ohio, $1.10.

9002. Cement, common, hydraulic, natural or portland. Limedale, Sellersburg and Speeds, Ind., Bay Bridge, Castalia and Silica, Ohio, New Castle and Universal, Penn., districts to Cincinnati, Ohio. Present, applicable as proportional rates on traffic destined beyond Cincinnati to territory, the description of which is not uniform; proposed, to provide the following application: "Applies only on traffic destined to points south of the south bank of the Ohio river and east of the Mississippi river, to which through rates are not in effect."

9008. Sand, core and loam: Allegan, Mich., to Hastings. Mich. Present, $2.50 per net ton; proposed, $1.26 per net ton.

9010. Sand, all kinds. Ottawa, Millington, Oregon, Sheridan, Utica and Wedron, Ill., to Lancaster, Ohio. Present, $3.40; proposed, $3.15.

9027. Brass slag, crushed, in box cars. North Chicago, Ill., to Lockland, Ohio. Present, 23½ cents; proposed, $2.50 per ton.

9028. Crushed stone. Centerville, Ohio, to Cincinnati, Ohio. Present, 80; proposed, 70 cents.

9029. Crushed stone. Woodville and Gibsonburg, Ohio, to Haskins and Grand Rapids, Ohio. Present, from Woodville, 11½ and 12 cents; from Gibsonburg, 12 cents and 13½ cents; to Haskins and Grand Rapids respectively; proposed, to Haskins, 80 cents; Grand Rapids, 90 cents per net ton.

9030. Sand and gravel, all kinds. Cannelton, Evansville, Rockport, Tell City and Troy, Ind., to Montague, Mich. Present, 32 cents; proposed, $3.60 per net ton.

9033. Crushed stone. Piqua, Ohio, to Cincinnati, Ohio. Present, 80 cents; proposed, 70 cents.

9038. Crushed stone. Middlepoint, Ohio, to Angola and Waterloo, Ind. Present, 19½ cents to Angola and 18½ cents to Waterloo; proposed, to Angola, $1.01; to Waterloo, 88 cents per net ton.

9049. Sand and gravel (except blast, engine, foundry, glass, loam, marl, molding and silica). Macksville and Terre Haute, Ind., to Peoria. Present, 19½ cents; proposed, $1.01 per net ton.

New England Freight Association Docket

6338. Cement, common hydraulic, natural or portland. Hudson, N. Y., to Beverly, Mass., $3.28 net ton via N. Y. C. Troy, N. Y., B. & M. R. R. Reason: To place N. Y. C. R. R. on same basis as B. & A. R. R.

6878. Molding sand. Elnora, Mechanicville, Reynolds, Schaghticoke, Schuylerville, Scotia, Saratago Springs, Stillwater, Wayville and Ushers, N. Y., to Norwich, Conn., 16 cents via Belchertown, Mass., and C. V. Ry. Reason: To place the C. V. Ry. route on a parity with the N. Y., N. H. & H. R. R. route.

6882. Cement, common, hydraulic, natural or portland. Hudson Upper, N. Y., to Pine City, N. Y., 15½ cents. Reason: To publish same rate effective to contiguous territory.

6886. Filter sand. North Wilbraham, Mass., to Ausable Forks, N. Y., 27½ cents. Reason: To meet rates from competitive points.

Southern Freight Association Docket

15291. It is proposed to establish commodity rate of $1 per net ton on sand and gravel, carloads, from Tarzan, Fla., to Warren Switch and Neshota. Ala., in lieu of present Class N rates. Suggested rate is made in line with rates from and to other points on the L. & N. R. R. for similar distances.

15295. It is proposed to establish commodity rate of 4 cents per 100 lb. on sand and gravel, straight carloads, from Bowling Green, Ky., to Woodburn, Salmon and Franklin, Ky., in lieu of class rate of 6 cents applying to Woodburn and class rate of 7 cents applying to Salmon and Franklin, Ky. Proposed rate, same as that generally observed between other points on L. & N. R. R. for similar distances.

15308. It is proposed to establish rates on sand and gravel, carloads, from Nashville, Tenn., to Memphis, Tenn., Hickman, Ky., and points intermediate thereto on the same basis as road-building stone from Mimms, Tenn., to the extent commodity rates are applicable from the latter point less than existing rates on sand and gravel from Nashville. Further, it is proposed to apply from Memphis to Nashville on sand and gravel, carloads, same rate as proposed to apply in the reverse direction. Present and proposed rates to representative points are as follows, from Nashville, Tenn., to the following points (in cents per net ton):

	Present	Proposed
Gleason, Tenn.	113	108
Martin, Tenn.	113	102
Union City, Tenn.	113	108
Hickman, Ky.	122	120
Jackson, Tenn.	113	108
Denmark, Tenn.	124	121
Oakland, Tenn.	135	121
Memphis, Tenn.	135	121

From Memphis, Tenn., to Nashville, Tenn., present, 135; proposed, 121. Proposed rates, except to Hickman, Ky., to apply only on intrastate traffic.

15330. Crushed stone, etc., carloads. From Stockbridge, Ga., to Atlanta, Ga. The present rate on crushed or rubble stone, carloads, minimum weight 20 net tons, from Stockbridge, Ga., to Atlanta, Ga., of 57 cents per ton is applicable "for delivery on Southern Railway tracks only," and it is proposed to remove this restriction.

15359. Sand and gravel, carloads. From Gravel Pit, N. C., to Corapeake Junction, Va. Present, $3.60 per ton (Suffolk, Va., combination); proposed, $1.60 per net ton, made in line with various rates on sand and gravel from Gravel Pit to points in Virginia located on the N. S. R. R., also in line with the rates for similar distances from other points on the N. S. R. R.

15365. Sand and gravel. Carloads, from Petersburg, Va., to Sebrell, Va. Present, $2.09 per ton (Jarratt combination); proposed, $1.08, same as present rate from Arundel Siding, Old Dominion Siding, Ellerslie, and Puddledock, Va.

15379. It is proposed to establish a rate of $1.58 per net ton on slag, carloads from Birmingham, Ala., and group to Auburn, Ala., made with relation to rates in effect to other points, same to apply in lieu of combination.

15382. It is proposed to revise the rates on sand and gravel, carloads, from Henderson, Ky., and Evansville, Ind., to L. & N. R. R., Henderson Division, Morganfield Branch and M. H. & E. Division stations, to basis of rates in effect from and to other points on the L. & N. R. R. for similar distances. Statement of present and proposed rates will be furnished interested parties upon request.

15405. Sand and gravel. Carloads, from Williams, Ga., to South Georgia Ry. stations in Florida. Lowest combination now applies. It is proposed to establish commodity rates ranging from $1.10 to Lovett, Fla., up to $1.20 to Garbetts, Fla., and $1.30 per net ton to Hampton Springs, Fla. The proposed rates are based on the point trunk line scale submitted by carriers to the Alabama and Georgia Commissions, reduced 10% under I. C. C. Docket 13293, increased to the next naught (0) or five (5), as the case may be.

15423. Sand and gravel. Carloads, from Montgomery, Ala., to South Georgia Ry. stations. Quitman, Ga., combination now applies. Proposed, per net ton: To Roundtree, Ga., to Graceville, Fla. inclusive, $1.89; to Vickers, Fla., to Sirmans. Fla., inclusive, $2; to Shady Grove, Fla., to Hampton Springs, Fla., inclusive, $2.05. The purpose of the proposed rates is to enable Montgomery shippers to meet competition at other southern producing points.

15424. It is proposed to establish through rate of $1 per net ton on gravel, carloads, from Camden to Henderson, Tenn. (intrastate), in lieu of present rate of $1.13 per net ton. The proposed rate is made in line with that applicable from Elco and Gravel Pit, Ill.

15452. Slag. Carloads, from Birmingham, Ala., and Group to Live Oak, Fla. Present, $2.99 per net ton (Jacksonville, Fla., combination) proposed, $2.25 per net ton, same as present rate to Perry, Fla.

15459. Gravel, Novaculite or ganister. Carloads, from Elco and Gravel Pit, Ill., to Hickman, Ky. Present, 30 cents per 100 lb.; proposed, $1.65 per net ton, based on Union City, Tenn., combination.

15471. It is proposed to establish commodity rates on crushed stone, carloads, from Trent, Va., to London, Ky., 6 cents and to Fariston and Lily, Ky., 5 cents per 100 lb., in lieu of present Class A rates. Proposed rates made in line with rates from and to other points on the L. & N. R. R. for similar distances.

15490. Gravel. Carloads, from Hobbs Island, Ala., to Florence and Sheffield, Ala. Present, $1.44 per net ton (combination); proposed, to Florence, $1.31; Sheffield, $1.26 per net ton, based on proposed Alabama scale, less 10% for joint line distance.

15501. It is proposed to establish rates on sand and gravel, carloads, from Western Railway of Alabama sand and gravel pits to Florence, Ala., of $1.76 per net ton. The proposed rate represents reductions, and is based on scale submitted to the Alabama and Georgia Public Service Commission for application between trunk lines.

Southwestern Freight Bureau Docket.

1805. Sand. To establish 9702 scale of rates on sand, carloads, from Missouri points on the St. L. S. F. Ry. and Mo. Pac. R. R. west of St. Louis to Pacific, inclusive, to points in Arkansas, Louisiana, etc., as shown in S. W. L. Trf. 114A. There being sand producing points located on both the St. L. S. F. Ry. and Mo. Pac. R. R. it is contended that it would not be proper to apply the scale via one line and not also via other lines; hence the suggestion that on this commodity the scale should be applied from all producing points located between St. Louis and Pacific.

1810. Cement. To establish rate of 23½ cents per 100 lb. on cement, carloads, minimum weight 50,000 lb., from Ada, Okla., to stations on the A. & V. Ry. except Vicksburg, Miss. Proposed change is desired to place rate from Ada on a proper basis with relation to rates in effect from points in the Kansas gas belt.

1823. Lime. To amend Item 3688A, S. W. L. Trf. 58-O, applying on lime, carloads, minimum weight, 30,000 lb., from Carey, Ohio, to Shreveport, La., and points named in Item 3688A of S. W. L. Trf. 58-O by adding McVittys, Ohio, as a point of origin at the same rates as now published from Carey, Ohio. McVittys being in the neighborhood of Carey, it is contended that the same rates should be applied to both points.

1883. Cement plaster and articles taking same rate. To establish stopover privilege on cement plaster, carloads, to partly unload (one stop) at protection of through rates applicable from point of origin to final destination, plus $6.30 per car for the stop, for application of traffic from Oklahoma producing points to interstate points. Shippers request that the privilege be extended to include all destinations not now covered to which through rates apply in order to be placed on a parity with Texas producers.

1894. Cement. To establish following rates on cement, carloads, as described in S. W. L. Trf., 90-E minimum weight 50,000 lb., from Harrys and Eagle Ford, Texas, to stations in Arkansas on the Mo. Pac. R. R. as shown below (proposed rates in cents per 100 lb.):

Walnut Ridge to Russell	23
Bald Knob to McAlmont	23
North Little Rock to Smithton	20½
Gurdon to Chelsea, Inc.	20½
Hope to Post Pipe Co., Spur, Ark.	20½
Sellmeyer to Powell	26½
Nettleton	24½
Apt to Vandale	24½
Forrest City	24½
Bonnair to Marianna	25
La Grange	25
Lexa	25
West Helena	22½
Helena	22½
Kendall to Pine City	23
Holly Grove	23
Clarendon	23
Raymond to Alfrey Spur	23
Brinkley	23
Barton	22½
Harbis to McArthur	22½
Halley to Arkla	22½

Indian	22½
Moore Spur to Sturdivant	23
Morton	23
Fair Oaks	23
Sweet Home to Brewster Spur	22½
Pine Bluff	22½
Fairfield to Tillar	22½
McGehee	22½
Trippe to Hurd's Spur	22½
Masonville Spur	22½
Dermott	22½
Baxter to Warren	23
Decker to Kimball	22½
Luma to Connerly	22½
Bayou Macon to Renfrow Spur	22½
Loyd's to Crossett	23
Atwood Spur to Chemical Spur	20½
Fairplay to Hot Springs	20½
Doane Spur to Delight	26½
Vaughn Creek	26½
Pike City	26½
Dolph	20½
Washington	20½
Ozan to Nashville	20½
Camden Branch Jct. to Eldorado	20½
Edwards Spur	20½
Nick Springs to White	20½
Huttig	20½
McGinty Spur, La	22½
Jones Spur to Sicard	22
Monroe	20½
Cobb Spur to Fondale	20½
Logtown to Kelley	20½
Standard to Rochelle	20½
Georgetown to Sand Spur	20½
Antonio to Granger Spur	20½
Anandale to Forest Hill	23½
Long Leaf	23½
McNary to Thomson	23½
Fontenot to Manchester	23½
Lake Charles	23½
Casoway Spur to Bomer	22½
Transylvania to Mansford	22½
Tallulah	22½
Laclade to Balmoral	22½
Franklin Spur to Panola	22½
Concordia	20½
Ferriday	20½
Sycamore	20½
Minorca Spur	20½
Vidalia	20½
Kilbourne to Eppa	22½
Vaughn to Bastrop	20½
Oak Ridge to Jonesboro	20½
Rayville	20½
Archibald to Chase	21½
Gilbert to Clayton	20½
Litro to Farmerville	20½

S. W. L. Trf. 90-E in many instances shows higher rates applicable from Eagle Ford and Harrys on cement to stations on the Mo. Pac. R. R. than is applied from the Kansas Gas Belt, Ada, Okla., Cape Girardeau, Mo., or other producing points. In view of the relative distances shippers request that basis proposed herein be established in order that the discrimination which now exists might be removed.

1950. Lime. To amend Item 3688A., S. W. L. Trf. 58-O, applying on lime, carloads, minimum weight 30,000 lb., from Martin, Ohio, to points in Louisiana, also Texarkana, Ark.-Texas, by adding Genoa, Ohio, as an origin point. It is contended that rate from Genoa should be the same as from Martin inasmuch as the rate from that point to St. Louis is the same as that from Martin, Ohio.

Trunk Line Association Docket

12175. (1) Gravel and sand. N. O. I. B. N. in Official Classification (except blast, engine, foundry, glass, molding or silica); (2) Sand, blast, engine, foundry, glass, molding and silica, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply. From New Milford, Penn. to Port Crane to Wells Bridge, N. Y., inclusive, (1) $1.25; (2) $1.35; Otego and Oneonta, N. Y., (1) $1.35; (2) $1.44; Collier to Schenevus, N. Y., inclusive, (1) $1.70; (2) $2.14; Worcester to Cobleskill, N. Y., inclusive, (1) $1.80; (2) $2.27; Hyndsville, to Schenectady, N. Y., inclusive, (1) $2; (2) $2.52. Rates in cents per net ton. (File 25383.)

12177. Lime, common, hydrated, quick or slack. Carloads, from Garbutt and Wheatland, N. Y., to eastern New England and Canadian points to which rates are published on Wall Plaster on same basis as applicable on wall plaster and plaster of paris. (File 25084.)

13181. Crushed stone. Carloads, minimum weight 90% of marked capacity of car except when car is loaded to cubical or visible capacity, actual weight will apply, from White Haven, Penn. to Slatington, Penn., to Allentown Penn., inclusive, $1.05 per net ton. (File 25409.)

12194. Sand and gravel. N. O. I. B. N. L. C. minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply from Farmingdale, N. J., to Grenloch, N. J., $1.61 per net ton. (File 25564.)

12198. Cement, common, hydraulic, natural or portland. Carloads, minimum weight 50,000 lb., except when for carrier's convenience cars of less capacity are furnished, in which case minimum weight will be the marked capacity of car furnished, but in no case less than 40,000 lb. from cement shipping stations on the L. & N. E. R. R. and N. & B. R. R. as well as stations in the Lehigh district to all stations on the Pittsburgh & Susquehanna R. R., 16 cents per 100 lb. (File 25531.)

Indiana Public Service Commission Prescribes Mileage Rates on Stone

THE Indiana public service commission announced its ruling in the complaint of the Midwest Crushed Stone Co. against the C. & E. I. railroad and the Pennsylvania railroad and in which the company asked an adjustment of rates on the shipments of crushed stone from its quarries at Greencastle and Spencer. In the order the commission prescribed a maximum mileage scale of rates for crushed stone.

The rate in cents for each ton shipped from Greencastle ranged from 75 cents on shipments to Terre Haute to $1.20 to shipments to Mt. Vernon, and from Spencer it ranged from 85 cents to Emison to $1.10 to Springfield, Erwin and Mt. Vernon. The rates became effective August 15.—*Indianapolis (Ind.) News.*

New Jersey Breaks Record in Sand and Gravel Production

THE PRODUCTION of sand and gravel in New Jersey during 1923 broke all previous records in both quantity and value, according to figures just published by the Department of Conservation and Development working in co-operation with the U. S. Geological Survey. During this period a total of 6,101,204 short tons of sand and gravel valued at $4,381,985 was produced, an increase of 1,246,771 short tons in quantity and of $956,842 in value over the preceding year.

While large quantities of special types of both sand and gravel were produced for specific purposes the largest item was for building purposes, evidencing the increasing use of reinforced concrete in building construction. The figures for this type of material are given as 2,755,848 short tons of sand and 1,366,212 short tons of gravel valued at $1,277,983 and $1,065,264 respectively.

In addition to the vast quantities used for building purposes the following amounts of various special types of sand and gravel are reported: Glass sand (for melting only), 186,898 short tons, value, $306,956; molding sand, 670,225 short tons, value, $833,004; cutting and grinding sand, 76,499 short tons, value, $205,689; fire or furnace sand, 63,719 short tons, value, $89,925; engine sand, 60,899 short tons, value $37,377; paving or road making sand, 672,338 short tons, value, $339,398; filter sand, 33,740 short tons, value, $54,635; miscellaneous sands, 74,660 short tons, value, $85,370; paving and road making gravel, 140,166 short tons, value, $92,254.—*Newark (N. J.) News.*

Taylor-Wharton Iron and Steel Company Honors Old Employes

MONDAY evening, August 4, at the Community House of the Taylor-Wharton Iron and Steel Co., High Bridge, N. J., there was a celebration in honor of company's service employes.

The meeting was taken in charge by Superintendent G. R. Hanks, who explained the purpose of the gathering as: First, an opportunity for a look into the past; 2nd, to review service records and employes producing them, and 3rd, a thrill and stimulation to emulate these records among the younger generation.

S. M. Buck, works manager, had gathered together statistics as follows:

"There are today at High Bridge 221 employes who have given the company 15 years or more of service; 99 employes who have served a quarter of a century or more; 30 who have given 35 years; 13 who have done their bit for at least 45 years, and 11, now living, who have been enlisted one-half century or more.

"There are also five deceased members of the Honor Roll or Half Century Club. Two men of this club have given 52 years, one 53 years, one 54, two 55 years and two 58 years. Six members of our Half Century Club are still in active service and would have it known that they can still do their bit.

"There are employed at the High Bridge plant at present five 'three generation' families, where father, son and grandson are giving their best.

"It would be impossible to separate from the Taylor company such family names as Cullen, Apgar, Meade, Latimer, Nagle, Alpaugh and many others.

"It is a fact that the Cullen family has been connected with our company and given a combined service of 151 years as follows: Jeremiah Cullen, Sr., 54 years; John Cullen, 37 years; Patrick Cullen (deceased), 29 years; Jeremiah Cullen, Jr., 26 years, and Madelyn Cullen, five years."

Suitable mementos were presented to old employes together with words of appreciation of their long, loyal and honorable service.

Sand Producer Makes Concrete Culvert Pipe

GILBERT F. ENDSLEY, owner of the Kimberly Sand and Stone Co., Somerset, Penn., has a complete products plant a short distance south of town. He has been notified that the concrete culvert pipe he manufactures has passed all tests to which it was submitted in the testing laboratory of the Pennsylvania State Highway Department, and that his product is accepted for all classes of road construction.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Buffalo, N. Y.	1.30 per net ton all sizes					
Chaumont, N. Y.	1.00	1.00	1.75	1.50	1.50	1.50
Cobleskill, N. Y.	1.35	1.35	1.25	1.25	1.25	.....
Columbia, Ill.	1.10	1.20	1.35	1.35	1.20	1.20
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	.....	.....
Northern New Jersey	.....	.....	1.40	1.40	1.40	.....
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Walford, Penn.	.....	.....	.....	.....	1.60b	.....
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.50	.....	1.50	1.35	.....	.....
Buffalo, Iowa	.90	.....	1.25	1.05	1.10	1.10
Cypress, Ill.	1.10@1.30	.....	.....	.....	.....	.....
Dundas, Ont.	.75	1.00	.90	.90	.90	.90
Gary, Ill.	1.10	1.40	1.10	1.10	1.10	1.10
Greencastle, Ind.	1.25	1.25	1.05	1.05	1.05	1.05
Krause, Ill.	1.10	1.20	1.35	1.35	1.20	1.20
Lannon, Wis.	.90	1.10	1.10	.95	.95	.95
Northern Wisconsin	.75	.....	1.05	.95	.95	.....
River Rouge, Mich.	1.00	1.00	1.00	1.00	1.00	1.00
St. Vincent de Paul, P. Q.	.75	1.25@1.45	1.10	1.00	1.00	1.00
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	.....
Stone City, Iowa	.75	.....	1.20	1.10	1.05	.....
Toronto, Canada	1.90‡	2.25‡	2.25‡	2.25‡	2.00‡	2.00‡
Valmeyer, Ill.	1.10	1.20	1.35	1.35	1.20	1.20
Waukesha, Wis.	1.15	1.15	1.15	1.15	1.15	1.15
Youngstown, Ohio	.....	.....	.....	1.50	1.60	1.60
SOUTHERN:						
Alderson, W. Va.	.75	1.75	1.75	1.60	1.50	.....
Bridgeport and Chico, Texas	1.00§	1.35a	1.30a	1.25	1.25	1.10
Cartersville, Ga.	1.75	1.65	1.65	1.00	1.00	1.00
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Graystone, Ala.	Crusher run with fines out, 1.00 per net ton					
Graysville, Ga.	1.00	1.00@1.25	.....	.85@1.00	.85@1.00	.....
Russellville, Ala.	1.25	1.25§	1.50a	1.15§	1.00a	1.00
WESTERN:						
Atchison, Kans.	.50	.....	2.00	2.00	2.00	1.60‖@2.00
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.35	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	.....
Cypress, Ill.	1.00@1.10	.....	.....	.....	.....	.....
Duluth, Minn.	1.00	2.25	1.90	1.50	1.35	1.35
El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	.....
E. Summit, N. J.	1.50	2.00	1.80	1.40	1.40	.....
Eastern Maryland	1.10	1.75	1.70	1.60	1.50	1.50
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.75	1.70	1.60	1.50	1.50
Meriden, Middlefield, New Britain, Rocky Hill, Conn.	.60	1.60	1.35	1.15	1.00	1.00
Northern New Jersey	1.50	2.00	1.80	1.40	1.40	.....
Oakland, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Richmond, Calif.	.50	.....	1.50*	1.50*	1.50*	.....
San Diego, Calif.	.50@ .75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	1.60	2.00	2.00	1.60	1.60	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	.....
Columbia, S. C.	.50	.....	2.00	1.50@2.00	.....	.....
Eastern Penn.—Sandstone	1.25	1.65	1.60	1.40	1.40	1.25
Eastern Penn.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.—Granite	.75	1.60	1.60	1.25	1.25	1.10
Lohrville, Wis.	1.65	1.65@1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.50	2.00@2.25	.....	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	.....

*Cubic yd. †1 in. and less. ‡Prices include 90c freight. ‖Rip rap per ton. §Dust in. (a) Dust out. (b) less 10c 15 days.

Agricultural Limestone
(Pulverized)

Asheville, N. C. — Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Bridgeport and Chico, Texas; bulk 5.50

Cartersville, Ga. — Pulverized limestone, all thru 10 mesh 1.75
80% thru 200 mesh 2.65

Chaumont, N. Y. — Pulverized limestone, bags, 4.00; bulk 2.50

Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk 4.00

Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh. 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk 3.00

Hillsville, Penn. — Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk 3.50

Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk 2.50

Knoxville, Tenn.—80% thru 100 mesh, bags, 3.75; bulk 2.50

Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk 3.50

Marion, Va. — Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton 2.00

Mayville Wis.—59.8% thru 60 mesh 2.35

Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags 5.00

Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100 2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk 3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk 5.50

Rockdale, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

West Stockbridge, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

Agricultural Limestone
(Crushed)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 100 mesh 1.50

Alton, Ill.—Analysis 98% $CACO_3$; 50% thru 4 mesh 1.75

Bedford, Ind.—Analysis, 98½% $CACO_3$, ½% $MgCO_3$; 90% thru 10 mesh 1.50

Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50

Blackwater, Mo.—95% $CaCO_3$; 100% thru 8 mesh 1.00

Bridgeport and Chico, Texas—90% thru 100 mesh; 50% thru 100 mesh; 90% thru 50 mesh, bulk 2.50
50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh; bulk 1.50

Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Cypress, Ill. — Analysis, 90 to 96% $CaCO_3$; 90% thru 100 mesh and thru 50 mesh, 50% thru 50 mesh, 90% thru 4 mesh	1.90
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50
Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 100 mesh	1.10
Kansas City, Mo.—50% thru 100 mesh	1.25
Krause, Columbia and Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh	1.10
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 85% thru 10 mesh; 53% thru 50 mesh; 40% thru 100 mesh bulk	2.60
32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	2.25
Milltown, Ind. — Analysis, 94.41% $CACO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh .38% thru 50 mesh	1.45@ 1.60
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$ —50% thru 100 mesh; 50% thru 4 mesh	1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh	1.25
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

Glass Sand:	
Berkeley Springs, W. Va.	2.25@ 2.50
Cedarville, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass:	
6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.50@ 1.75
Grays Summit and Klondike, Mo.	2.00
Mapleton, Penn.	2.00@ 2.25
Mapleton Depot, Penn.	2.25@ 2.50
Massillon, Ohio	3.00
Michigan City, Ind.	.50
Mineral Ridge, Ohio	2.50@ 3.00
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Pa.—Dry	4.00
Damp	3.00
Ridgway, Pa.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	1.50@ 3.00
South Vineland, N. J.—Damp	1.75
Dry	2.25
Thayers, Penn.	2.25@ 2.50
Utica, Ill.	1.25
Zanesville, Ohio	2.50
Foundry Sand:	
Albany, N. Y.:	
Core	1.50
Molding fine, brass molding	2.25
Molding coarse	2.00
Sand blast	4.00
Arenzville, Ill.:	
Core	.75
Molding fine	1.40@ 1.60
Brass molding	1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse	5.00
Sand blast	5.00@ 8.00
Stone sawing	6.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Attica, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Penn.		1.00*		1.50*	2.00*	
Farmingdale, N. J.	.58	.48	.75	1.10	1.10	
Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Leeds Jct., Maine		.50	1.75		1.35	1.25
Machias, N. Y.	.75	.75	.75	.75	.75	.75
Northern New Jersey		.50	1.25		1.25	1.25
Pittsburgh, Penn., and vicinity	1.25	1.25	.85	.85	.85	.85
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.50@ .60			.60@ .70	.60@ .70
Columbus, Ohio	.75	.75	.85	.75	.75	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.50	1.25	1.60	1.60	1.60
	Unwashed ballast, .50 a ton; washed, .75 (none screened)					
Eau Claire, Wis.	.40	.40	.85@1.25			.85
Elkhart Lake, Wis.	.50	.40	.40	.50	.50	.50
Ft. Dodge, Iowa	1.00		2.05	2.05	2.05	
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.50		.80	.70	.70
Hamilton Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.50	1.35§		1.35	
Milwaukee, Wis.	1.01	1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.65	2.50†	2.00§		2.00	1.75
Moline, Ill.	.60	.60	1.20	1.20	1.20	1.20
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Riton, Wis.	.40	.20			.40	
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65§	1.45		1.45‖
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.75	.90	.90	.85
Waukesha, Wis.	.55	.55	.75	.75	.75	.75
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .58 pit			
Zanesville, Ohio	.70	.60	.60	.60	.90	.90
SOUTHERN:						
Brookhaven, Miss., Roseland La.		.50	1.35			
Charleston, W. Va.	all sand 1.52 f.o.b. cars		all gravel 1.63 f.o.b. cars			
Estill Springs, Tenn.	1.00	.90			.85	.85
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.50	.50		.75	.75	.75
New Martinsville, W. Va.	1.00	.90		1.20		.90
WESTERN:						
Baldwin Park, Calif.		.25@ .35			.50@ .75	
Crushed rock	.90@1.10	.60@ .90	.60@ .90	.60@ .90	.60@ .90	
Kansas City, Mo.			Kaw river sand .75 per ton f.o.b. plants			
Los Angeles, Calif.	1.00*	1.00*	1.50*	1.50*	1.40*	1.40*
Pueblo, Colo.	1.10*	.90*		1.75*		1.60*
San Diego, Calif.	50@ .65	.80@ .90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*
Webb City, Mo.	.75	.75	.25@ .75b	.85b	1.25c	1.15c

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	.75	.50			1.25	
Dudley, Ky.‡	1.05	1.05		.95		
East Hartford, Conn.			Sand, .65 per cu. yd.			
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.55		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas						.55
Macon, Ga.	.35					
Mankato, Minn.			Pit run gravel, .60			
Moline, Ill.	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.						1.55
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Zanesville, Ohio	.60	.60				

*Cubic yd.; †roofing gravel; §⅝ in. and less; ‡crushed rock; ‖2½ in. and less; (a) ¾ in. and less; (b) flint chats; (c) crushed flint.

Miscellaneous Sands

(Continued from preceding page)

Columbus, Ohio:	
Core	.25@ .35
Furnace lining	2.00@ 2.50
Molding fine	1.50@ 2.00
Molding coarse	1.50@ 1.75
Sand blast	3.50@ 5.00
Stone sawing	1.50
Traction	.25@ 1.00
Brass molding	2.00
Dunbar, Penn.:	
Traction (damp)	2.00
Eau Claire, Wis.:	
Roofing sand	3.25@ 4.25
Sand blast	3.25
Core	1.25
Elco, Ill.:	
Ground silica per ton in carloads	20.00@31.00
Grays Summit, Mo.:	
Molding fine	1.75@ 2.00
Kasota, Minn.:	
Stone sawing	1.25
Klondike, Mo.:	
Molding fine	1.75@ 2.00
Mapleton, Penn.:	
Molding fine, sand blast	2.00
Mapleton Depot, Penn.:	
Molding coarse, roofing sand	2.25
Molding fine	2.50
Traction	2.00@ 2.25
Massillon, Ohio:	
Molding fine, coarse, furnace lining and core, traction, stone sawing	2.50
Mineral Ridge and Ohlton, Ohio:	
Furnace lining, molding fine (both green)	1.75
Molding coarse, roofing sand, sand blast, stone sawing, traction (all green)	2.00
Montoursville, Penn.:	
Core	1.25@ 1.50
Traction	1.25
New Lexington, Ohio:	
Roofing sand	2.00
Molding coarse	1.50
Ottawa, Ill.:	
Crude silica sand	.75@ 1.00
Core, furnace lining, steel molding	1.50
Roofing sand	1.50@ 4.50
Sand blast	4.50
Pacific, Mo.:	
Core, furnace lining	1.00@ 1.25
Molding fine	.90@ 1.00
Stone sawing	1.00@ 1.75
Molding coarse	.85@ 1.00
Ridgway, Penn.:	
Core	2.00
Furnace lining, molding fine, molding coarse	1.25
Traction	2.25
Round Top, Md.:	
Roofing sand	2.25
Traction	1.75
St. Louis, Mo.:	
Core	1.00@ 1.75
Furnace lining	1.50
Molding fine	1.50@ 2.50
Molding coarse	1.25@ 1.75
Roofing sand	1.75
Sand blast	3.50@ 4.50
Stone sawing	1.25@ 2.25
Traction	1.25
Brass molding	2.00@ 3.00
San Francisco, Calif.:	
(Washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@ 3.50

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00	.....	1.25	.....	.....	.....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.45	.....	1.45	1.45	1.45	.....
Jackson, Ohio	.....	1.30	.....	1.30	1.30	1.30	.....
Toledo, O.	1.50	1.35	1.50	1.35	1.35	1.35	1.35
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	.....	1.55	.....	1.55	1.55	1.55	.....
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.30
Buffalo, N. Y.	.....	.....	.....	12.00	.....	.....	.....	.....
Lime Ridge, Penn.	.....	.....	.....	.....	.....	.....	5.00a	.....
Williamsport, Penn.	.....	.....	10.00	.....	.....	.....	6.00	.....
York, Penn.	.....	10.50	10.50	11.50	.....	.....	8.50	1.65i
CENTRAL:								
Cold Springs, Ohio	.....	9.50	9.50	.....	9.00	11.00	9.00	.....
Delaware, Ohio	12.56	10.00	9.00	10.50	.....	.....	9.00	1.60
Gibsonburg, Ohio	12.50	.....	9.50	.....	9.00	11.00	9.00	.....
Huntington, Ind.	.....	9.50	9.50	.....	9.00	.....	8.50	1.50b
Luckey, Ohio	12.50	.....	.....	.....	.....	.....	.....	.....
Marblehead, Ohio	.....	9.50	9.50	.....	.....	.....	8.50	1.50c
Marion, Ohio	.....	9.50	9.50	.....	.....	.....	8.50	1.70j
Mitchell, Ind.	.....	12.00	12.00	12.00	11.00	.....	10.00	1.70e
Tiffin, Ohio	.....	.....	.....	.....	9.00	.....	.....	.....
White Rock, Ohio	12.50	.....	.....	.....	9.00	11.00	.....	.....
Woodville, Ohio	12.50†	9.50†	8.50†	.....	9.00	.....	9.00	1.60
SOUTHERN:								
Erin, Tenn.	.....	.....	.....	.....	.....	.....	8.50	1.40*
El Paso, Texas	.....	.....	.....	.....	.....	.....	14.00	2.00
Graystone, Ala.	12.50	11.00	.....	11.00	.....	.....	8.50	1.50k
Karo, Va.	.....	10.50	9.00	.....	.....	.....	7.00g	1.65h
Knoxville, Tenn.	22.00	11.00	.....	11.00	.....	.....	8.50	1.50
Varnons, Ala. (f)	11.00	11.00	11.00	11.00	9.00	11.00	8.50	15.00
Zuber and Ocala, Fla.	14.00	12.00	10.00	.....	.....	.....	11.00	1.60
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	12.50h	.....
San Francisco, Calif.	22.00	22.00	15.00	22.00	.....	.....	.....	2.50
Tehachapi, Calif.	.....	.....	.....	.....	.....	.....	13.00	2.00d

*And 1.50; †50-lb. paper bags; (a) F. O. B. Kilns; (b) wooden bbl.; (c) wooden, steel 1.70; (d) to 2.15; (e) 180-lb. wooden bbl.; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. bbl.; 2.65, 280-lb. bbl.; (j) steel; (k) jute bags, 1.35.

Miscellaneous Sands

(Continued)

San Francisco, Calif. (Direct from Pit)	
Furnace lining, molding coarse, sand blast	3.60
Stone sawing, traction	2.30
Tamalco, Ill.:	
Molding coarse	1.40@ 1.60
Brass molding	1.75
Tamms, Ill.:	
Ground silica per ton in carloads	20.00@31.00
Thayers, Penn.:	
Core	1.90
Molding fine and coarse	1.25
Traction	2.25
Utica, Ill.:	
Core, furnace lining, molding fine and coarse	.60@ 1.25
Roofing sand, traction	1.25
Sand blast	2.50
Stone sawing	1.25@ 2.50
Brass molding	.75@ 1.25
Warwick, Ohio:	.....
Core, molding fine and coarse (all green) 1.75; all dry	2.50
Traction	2.50
Furnace lining, brass molding (green)	1.75
Zanesville, Ohio:	
Sand blast, core, traction	2.50
Molding fine	2.00
Molding coarse	1.50
Furnace lining	2.25
Brass molding	2.00

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel workers' crayons, per gross	1.25
Chatsworth, Ga.:	
Crude (for grinding)	6.00
Ground (150-200 mesh, bags)	12.00
Pencils and steel workers' crayons	1.25@ 2.50
Chester, Vt.:	
Crude	5.00
Ground (20-50 mesh) bags extra	7.00@ 8.00
Ground (150-200 mesh) bags extra	8.00@10.00
E. Granville, Rochester, Johnson, Waterbury, Vt.:	
Ground talc (20-50 mesh) bags	7.00@10.00
Ground talc (150-200 mesh) bags	10.00@25.00
Pencils and steel workers' crayons, per gross	.75@ 2.00
Emeryville, N. Y.:	
(Double air floated) including bags; 200 mesh, 13.75; 325 mesh	14.75
Gouverneur, N. Y.:	
Ground, in bags, f. o. b. cars	15.00@22.00
Henry, Va.:	
Crude talc (mine run) per 2000-lb. ton	3.00@ 4.00
Ground (150-200 mesh), bags	8.50@15.00
Joliet, Ill.	
Ground (150-200 mesh) bags	28.00@30.00
Keeler, Calif.:	
(150-200 mesh); carloads, 30 tons or more (bags extra)	20.00@30.00
Marshall, N. C.:	
Crude	4.50
Ground (20-50 mesh), bags extra	6.50
Ground (150-200 mesh), bags	8.00@10.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), 200-lb. bags	13.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Centerville, Tenn.—B.P.L. 65%, bags	8.50
Bulk	6.50
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 5.00
Mt. Pleasant, Tenn.—B.P.L. 72%	5.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.	5.50
Twomey, Tenn.—B.P.L. 65%	7.00@ 8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$10.20	$10.00	$8.10	$7.80
24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10	12.60	11.00	8.70	8.75
18x10	12.60	11.00	8.70	8.75
18x 9	12.60	11.00	8.70	8.75
16x10	12.60	11.00	8.40	8.75
16x 9	12.60	11.00	8.40	8.75
16x 8	12.60	11.00	8.40	8.75
18x12	12.60	11.00	8.70	8.75
16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x 8	11.10	10.50	8.10	7.80
14x 7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Ground Rock

Mt. Pleasant, Tenn.—B.P.L. 65%	7.00
Twomey, Tenn.—B.P.L. 65%	7.00@ 8.00

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L.	2.25
70% min. B.P.L.	2.50
72% min. B.P.L.	2.75
75/74% B.P.L.	3.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	18.00@19.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.00@20.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		7.00
Easton, Penn.—Slate granules		6.50
Haddam, Conn. — Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk. marble (crushed, in bags	14.50@22.50	14.50@22.50
Ingomar, Ohio (in bags)		6.00@25.00
Middlebrook, Mo.—Red		25.00@30.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Creme and royal, bulk	15.00@20.00	15.00@20.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal.—Crushed quartz, red rock, greenstone, jasper, sacks		*10.00
Tuckahoe, N. Y.—2000 lb.		12.00
Wauwatosa, Wis.		20.00@30.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

*LCL, 10% higher.

Concrete Brick

Prices given per 100 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	20.00@22.00	25.00@35.00
Baltimore, Md.	15.00	24.00
Ensley, Ala. ("Slagtex")	12.50	22.50@33.50
Friesland, Wis.	22.00	32.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	14.00	20.00
Portland, Ore. (del. loc.)	21.00	30.00@100.00
Prairie du Chien, Wis.	14.00	22.00@28.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@40.00
Salem, Ore.	23.00	50.00
Seattle, Wash.	22.00	40.00
Wauwatosa, Wis.	14.00@15.00	28.00@75.00
Winnipeg, Can.	15.50	

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	15.00@16.50
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich.	11.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	13.00
Plant City, Fla.	10.00@11.00
Portage, Wis.	15.00
Rochester, N. Y.	19.75
Saginaw, Mich.	12.00
San Antonio, Tex.	12.50@13.50
Syracuse, N. Y. (delivered at job)	15.00@16.00
F.o.b. cars	18.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	20.00
Dallas, Tex.	20.00	.....
Denver, Colo.	24.00	.....
Detroit, Mich.	22.00	20.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	21.00	21.00
New York, N. Y.	18.20	13.10
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.60	22.60
Seattle, Wash. (paper sacks)	24.00	.....

Portland Cement

Prices per bbl. and per bag net in carload lots.

	Per Bag	Per Bbl.
Albany, N. Y.	.....	2.62
Atlanta, Ga.	.....	2.35
Boston, Mass.	.....	2.53@3.03†
Buffalo, N. Y.	.....	2.38@2.88†
Cedar Rapids, Iowa	.60	2.44
Cincinnati, Ohio	.61¾	2.47
Cleveland, Ohio	.59¾	2.39
Chicago, Ill.	.55	2.20
Columbus, Ohio	.....	2.44
Dallas, Texas	.53¾	2.15
Davenport, Iowa	.59¾	2.39
Dayton, Ohio	.....	2.48
Denver, Colo.	.63¾	2.55
Detroit, Mich.	.60	2.40
Duluth, Minn.	.54¾	2.19
Indianapolis, Ind.	.60¼	2.41
Kansas City, Mo.	.54¼	2.37
Los Angeles, Cal. (less 5c dis.)	.65	3.08
Memphis, Tenn.	.....	2.60
Milwaukee, Wis.	.58¾	2.35
Minneapolis, Minn.	.60½	2.42
Montreal, Canada (sks. 20c ext.)	.....	1.90b
New Orleans, La.	.....	2.40
New York, N. Y.	.....	2.15@2.65†
Philadelphia, Penn.	.....	2.41@2.81†
Phoenix, Ariz.	.82½	3.30
Pittsburgh, Penn.	.54¾	2.19
Portland, Ore.	.....	3.05
San Francisco, Cal.	.....	2.61*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.	.60½	2.42
Seattle, Wash. (10c bbl. dis.)	.....	2.90
Toledo, Ohio	.61¼	2.45

NOTE—Add 40c per bbl. for bags.
*5c cash disc. 10 days.
†Prices to contractors, including bags.
(b) Less 10c 20 days.

Mill prices f. o. b. in Carload Lots to Contractors

	Per Bag	Per Bbl.
Buffington, Ind.	.48¾	1.95
Concrete, Wash.	.....	2.60
Dallas, Texas	.....	2.05
El Paso, Tex.	.70	2.08*
Hannibal, Mo.	.....	1.95
Hudson, N. Y.	.....	2.05
Leeds, Ala.	.....	1.95
Los Angeles, Calif.	.....	2.65
Louisville, Ky.	.....	2.35
Northampton, Penn.	.....	1.95
Phoenix, Ariz.	.....	4.30†
Steelton, Minn.	.50	2.00
Universal, Penn.	.48¾	1.95

*Gross, 10c sacks and 10c per bbl. disc 10 days.
†Gross, 15c sacks and 5c per bbl. disc. 10 days.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

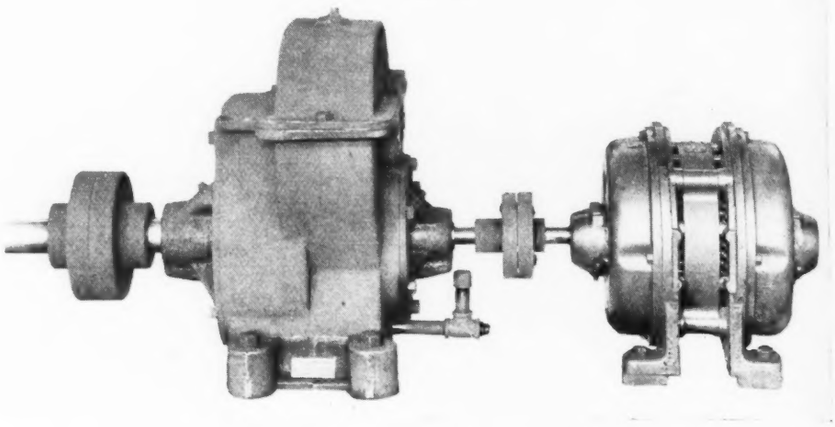
	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	Plaster Board ⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Agatite, Texas (a)	.....	.....	6.00	10.00	10.00	10.50	10.00	.....	19.00	.....	.....	.....	.....
Akron, N. Y. (a)	3.00	4.00	6.00	10.00	10.00	10.00	20.20	7.00@9.00	27.35	21.00	19.375	20.00	30.00@32.00
Black Hawk, S. D.	3.50	.....	7.00	10.00	10.00	10.50	.....	.....	.....	.....	.....	.....	.....
Blue Rapids, Kans. (a)	2.50	4.00	6.00	10.00	10.00	10.50	10.00	.....	23.15	19.00	19.375	20.00	.....
Denver, Colo.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	.....	6.00	.....	15.00	.....	.....	.....	.....	15.50	.....	.....	.....
Ft. Dodge, Iowa (a)	2.50	4.00	6.00	10.00	10.00	10.50	15.45	.....	22.70	20.00	19.375	20.00	30.00
Grand Rapids, Mich.	2.75	.....	6.00	10.00	10.00	10.00	.....	.....	.....	.....	.....	.....	.....
Gypsum, Ohio (a)	2.75	4.00	6.00	10.00	10.00	10.00	19.25	7.50	26.85	19.00	19.375	20.00	30.00
Port Clinton, Ohio	3.00	4.00	6.00	8.00	10.00	10.00	.....	7.50	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	12.00	12.00	15.40†	.....	.....	16.40‡	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	35.00

NOTE—Returnable Bags, 10c each; Paper Bags, $1.50 per ton extra (not returnable).
†CL.; LCL., $16.50; ‡finishing, CL.; LCL., $17.50; (a) prices are net of bags.

New Machinery and Equipment

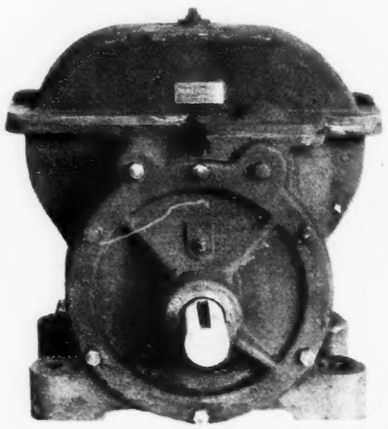
Spur Gear Speed Transformer

A SPUR GEAR speed transformer designated as its Industrial Type transformer has been brought out by the Hill Clutch Machine and Foundry Co., Cleveland, Ohio. This is for use where speed changes are required from motor to machine and from shaft to shaft and for such service as reducing speeds in connection with conveyor drives and for cement plant and other industrial uses where transformer units are operated under continuous or heavy service conditions. The speed change can be small or large as desired for practical power transmission. It is a closely coupled unit and requires comparatively little space.



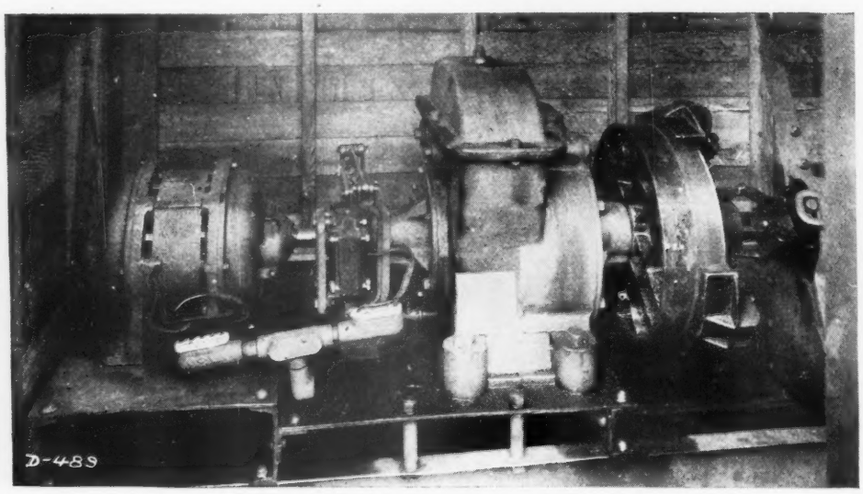
Spur gear speed transformer coupled to motor

The device is made up of a nest of plain spur gears revolving in oil and changing the speed of the input shaft to the desired speed of the output shaft. Two pairs of gears are used for small speed ratios and four pairs for large ratios, the even number of gears being necessary in order to obtain the same direction of rotation of both shafts. The power transmitted is the same in both shafts. The gears have 20 deg. involute cut teeth. It is pointed out that the short length of these teeth combined with powerful cross section insures great strength. The gear housing is a one-piece casting containing one large bearing braced to the housing At one end of the housing is a removable housing bearing for the high-speed shaft and at the other end a removable housing bearing for the low-speed shaft. With this construction both shafts are supported in double bearings. The housing cover is a plain casting, its only function being to seal the housing. The two intermediate shafts are fixed in position in the housing. Set screws in the high speed end of the housing secure these shafts against rotation and cap screws in the low speed end of the housing draw both shafts against shoulders and the housing itself. The first intermediate shaft carries two sets of spur gears and the second shaft one set, these gears revolving on their fixed shafts. The high-speed shaft carries a pinion and the low-speed shaft a large gear. All bearings are of bronze. Automatic lubrication is provided by a splash system and is effected by a circular disk on the high speed shaft.



End view of gears

The transformer is made in seven sizes. Each size has a number which bears a fixed relation to the diameter of the low speed shaft and each number represents the horsepower this shaft is capable of safely transmitting at 100 r.p.m. The horsepower capacity of the different sizes at that speed ranges from 10 to 160.



Sand and gravel plant installation showing motor, gears and clutch

Continuous Tread Osgood Shovel

THE OSGOOD CO., Marion, Ohio, has recently added continuous tread equipment to its line of mountings for standard shovels, supplementing the railroad truck and traction mountings.

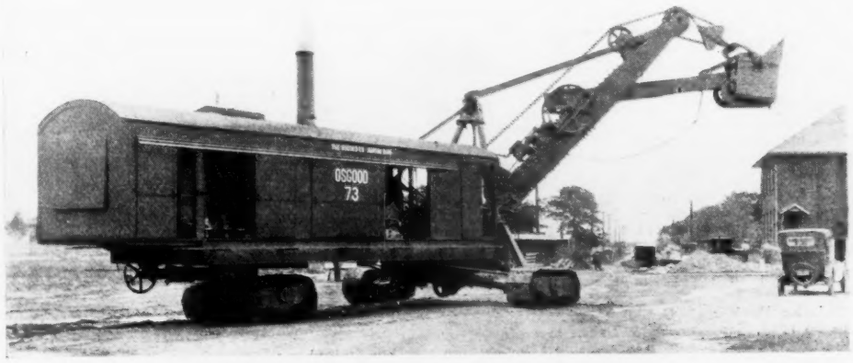
The continuous tread mountings are made for shovels of dipper capacities ranging from 1½ to 6 cu. yd., can be easily put on in the field to replace other mountings, and are easily removed when it is necessary to move the shovel by rail.

The new continuous tread mounting has much in common in the way of advantages with the heavy traction mounting introduced to the industry by the Osgood Co. These advantages are briefly that track and accessories are eliminated; the pit crew is dispensed with or greatly reduced; the shovel

can be kept in the most effective digging position, can back away from blasting and can travel and work in water; and that the time required for changing locations is very greatly reduced.

These results are obtainable with either type of mounting. The main difference in the two is in the nature of the ground surface each can negotiate. The traction wheels are most successful on hard bottoms, have greater simplicity and are lower in cost. The continuous tread mounting, at somewhat greater cost, enables the shovel to travel and work on comparatively broken and faulted and moderately soft surfaces.

The mounting consists of two continuous tread belt units carried on side brackets, replacing the jack arms at the forward end of the machine, and a narrow, double belt



New continuous tread Osgood shovel

truck occupying the same position as the rear railroad truck. The side brackets are somewhat similar in shape to the jack arms used with the railroad mounting and occupy the same position but are much heavier. They are very rigidly attached and braced.

The front tread belt units are mounted on journals at the outer ends of the jack arms and can rock to accommodate themselves to uneven ground surfaces.

The rear truck furnishes a third point of support for the shovel and has a universal action so as to rest firmly on uneven surfaces. Steering is accomplished by slewing the rear truck.

Propelling drive is through the front units only or through both front and rear trucks; the power is derived from the hoisting engines. The tractive effort is suitably increased by a series of heavy cast steel spur gears with teeth cut from the solid. These gears with their shafts are assembled in a sub-frame which can be put on or removed as a unit.

From the ends of the forward shaft in the sub-frame the power is continued out to each front unit by a universal jointed propeller shaft. Since the continuous tread units are free to rock, these shafts must be provided with means to enable them to work at varying angles.

Osgood has fitted each of these shafts with full universal joints and a telescoping slip joint. The universal joints follow automotive construction closely, are heavy yet compact and effectively lubricated. Wear is taken on renewable pins and bushings. The universals and slip joint permit the shaft to work efficiently at any reasonable angle and without the danger of the parts separating.

The rear truck may be built without driving connections and simply trail or may be driven by power from the hoisting engines as desired and according to the working requirements of the shovel. When the truck is driven the power is taken from a shaft in the sub-frame by a pair of bevel gears, continued to the truck by a longitudinal shaft fitted with universal joints and a slip joint and delivered through a second pair of bevel gears. The tread links used on the rear truck are interchangeable with those on the front units.

Steering is accomplished by slewing the rear truck by means of a transverse screw shaft carrying a traveling nut. The truck is provided with a steering tongue at the free end of which the nut is attached. Turning the screw shaft will cause the nut to travel along it, swinging the steering tongue and slewing the truck.

Power for steering is provided by a small double engine mounted on the deck beside the boiler fire-box. The drive is carried from the engine by cut steel spur gears to the screw shaft which is mounted up underneath the car frame.

The spread of the mounting at the front is approximately the same as the jack screw spread on the railroad mounting. This, with the weight of the forward units, makes the shovel perfectly stable under all conditions.

New Troughing Conveyors

OFFICIALS of the Stearns Conveyor Co., a Cleveland Ohio, manufacturer, assert that in building and designing their carriers for conveyor systems special thought has been given to devising equipment which will insure every possible measure of safety. The company build what are known as "troughing carriers," in which all-steel pulleys, antifriction bearings and pressure lubrication are used.

The cut, showing a cut-away section of a Stearns pulley, discloses some of the principal points of this carrier. The steel sheet is made of high grade cold-rolled steel plate of uniform thickness, giving a strong and perfectly balanced pulley. The bearings are mounted entirely inside of the pulley and thus protected from grit and dirt. They are continually bathed in a plentiful supply of lubrication. They are said to reduce friction and vibration to a minimum.

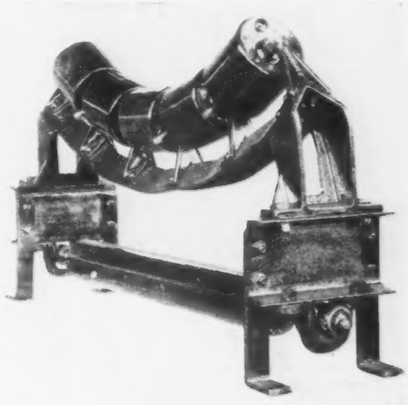
It will be noted that the pulleys have closed ends and there are no annular spaces inside of the pulleys to accumulate dust. The dished out ends afford no lodging place for dust to accumulate, as is frequently the case with pulleys not especially designed to avoid this.

The Stearns pulleys are mounted on a steel angle base, as illustrated. The ridge of the angle is turned up so that the legs form slopping sides on which there is no possibility of material accumulating under any circumstances.

The Stearns people in advocating their carriers for use in grain and other plants, where there is of necessity an important element of dust to be considered, stress the fact that from every angle the equipment is designed to prevent damage from the collection of such dust.

Another feature being stressed by this company and said to tend to produce safety in operation is the fact that it is practically impossible to block the Stearns pulley and prevent it from running. Frequently static discharges may result from a blocked pulley. With the possibility of dust or dirt accumulating on the carrier base having been eliminated there can be no danger from this source.

It is claimed that with lubrication by means of grease cups or oil, it is possible for grease or oil to saturate the surounding layer of dirt and dust, causing spontaneous combustion. The Stearns carriers are lubricated entirely by means of high pressure nipples, and there is no escape of grease or oil, it is said.



Stearns "troughing" conveyor pulley

News of All the Industry

New Incorporations

Legrand Stone Co., Des Moines, Iowa, has been incorporated for from $10,000 to $110,000.

Western Quarry Co., Tenino, Wash., has been incorporated for $25,000 by Andrew Wilson and A. G. Dempsey.

Pueblo Lime Co., Pueblo, Colo., has been incorporated for $25,000 by W. N. Thomas, J. D. Thomas and J. Brown.

Fitchburg Flint Co., Fitchburg, Mass., has been incorporated for $25,000. President and treasurer, N. Ward Thompson, Fitchburg.

North Star Builders Material Co., St. Paul, Minn., has been incorporated for $50,000 by Henry A. Erickson and others.

Concrete Gravel Co., Inc., Kentwood, La., has been incorporated for $100,000. A. N. Fussell, president; J. A. Thames, secretary.

Bear Creek Gravel Co., Denver, Colo., has been incorporated for $45,000. Directors: Charles J. Wall, H. B. Missilier, and William P. Kavanaugh.

Kansas Portland Cement Co., Kansas City, Mo., has been incorporated for $500,000. H. Struckmann, president, and Baxter D. McClain, secretary.

St. Louis Concrete Products Manufacturing Co., Brentwood, Mo., has been incorporated for $10,000 by C. H. Hunsaker, A. J. Hotfedler and others.

Robb Construction Co., Stuart, Fla., has been incorporated for $20,000 by R. L. Robb and others and is equiping a concrete manufacturing plant.

Prepared Lime and Mortar Co., Newark, N. J., has been incorporated for $25,000 to deal in building materials. (Ingraham, Page & Moran, New York.)

Cumberland Fertilizer and Lime Co., 160 Atlanta street, Bridgeton, N. J., has been incorporated for $150,000 to manufacture fertilizers, chemicals, etc.

Eureka Pressed Cement Brick Co., 812 Hollins street, Baltimore, Md., has been incorporated for $100,000 by John T. Goldwine, Levi A. Thompson and others.

California Rock and Sand Co., Los Angeles, Calif., has been incorporated for $100,000 by A. G. Lorbeer, R. Meadows, O. Meadows, H. H. Apel and B. Mead.

Wilson Lime Co., Inc., Buchanan, Va., has been incorporated for $50,000. Charles L. Allen, Kam, W. Va., president; Anna W. McCullock, Buchanan, secretary.

Valley Rock and Gravel Co., Los Angeles, Calif., has been incorporated for $100,000 by R. M. Jennings, S. M. Acosta, F. Acosta, E. A. Jennings and William Miller.

Superior Fluorspar Corporation, care of the Colonial Charter Co., Ford building, Wilmington, Del., has been incorporated for $300,000 to operate fluorspar properties and reduction plants for commercial production.

Signal Mountain Sand and Gravel Co., Chattanooga, Tenn., has been incorporated for $250,000 by John L. Senior, C. S. Stewart, F. A. Stephenson, J. P. Hoskins, 831 Oak street, Chattanooga, W. A. Ladd and J. J. Caldwell.

Arkansas Mineral Products Co., Inc., Little Rock, Ark., has been incorporated for $16,000 to operate reduction plants for commercial mineral products. Incorporators: J. M. Ensor and W. A. Hall, 120 Prospect street, Little Rock.

Milwaukee Lannon Stone Co., Milwaukee, Wis., has been incorporated for $25,000 to quarry and market limestone. Incorporators: Hugo and Louise J. Kraenzlein, 1628 Seventh street, Milwaukee, and H. Schatschneider.

Mirene Co., Vancouver, Wash., has been incorporated for $30,000 to mine and quarry stone and other rock formations. John Wilkinson of Vancouver, J. Burpee, W. T. Joplin, C. J. Eldon and J. H. Kelly of Portland, Ore., are trustees.

Grant County Gravel and Sand Co., Marion, Ind., has been incorporated with 250 shares of no par value to excavate for gravel, stone and sand. The directors are: Linfield Myers, Thomas E. Johnson, Harry M. Bartlow and Samuel Warner.

Standard Staff and Stone Co., 227 South Alvarado street, Los Angeles, Calif., has been incorporated for $10,000 to manufacture and sell plaster of paris, artificial stone, staff ornamentation, etc. Directors: H. E. Bianchi, L. S. Farmer and F. J. McCarthy.

J. S. Bower Stone Co., Wabash, Ind., has filed articles of incorporation. Mr. Bower is from Decatur, Ind., and will be in charge of the plant south of the city, formerly operated by W. T. Horn and Orley Grey. Associated with Mr. Bower will be D. A. Pike and Charles Latchem. The equipment of the stone quarry has been leased from Mrs. Orley Grey for four months at 9 cents a cubic yard of stone, and the owners of the quarry, L. L. Hyman and Charles Latchem, will receive 6 cents a cubic yard for the stone. It is reported that D. A. Pike is interested in the project in order to procure crushed stone for the roads he is constructing in Wabash county and will thus be able to obviate long hauls and long waits in deliveries. Men have been hired at the quarry and work has already begun. Crushed stone and gravel will be the products of the plant and several contracts are now in sight, it is reported. A report has also been circulated to the effect that Mr. Bower expects to organize a company which will have an investment at the plant of $50,000 to $60,000.

Sand and Gravel

Perkins Sand and Gravel Co., Burbank, Calif., is about to put in sand loaders and conveyors at 12222 San Fernando road to cost $6500.

J. J. Forbes, Claremont, Calif., has purchased a 63-acre tract of land for the erection of a rock and gravel plant estimated to cost about $150,000.

Clyde J. Nelson & Co., Route 4, Portland, Ore., is a company formed by Clyde J. Nelson and A. E. Hanson to engage in the sand and gravel business.

Clarke Rock and Gravel Co., 3326 San Fernando road, San Fernando, Calif., is about to begin the construction of a gravel storage plant on McBroom avenue, near Wheatland.

Silver Springs Sand and Gravel Co., Silver Lake, N. Y., has completed the construction of its plant under direction of G. O. Spaulding and is in operation. The company has a capital stock of $150,000. Officers: President, Wilson M. Crevelng, Mount Morris; vice-president and general manager, G. O. Spaulding; and secretary and treasurer, W. M. Spaulding.

Drew Gravel Co., Delight, Ark., has recently begun two 8-hr. shifts at its plant which has installed $25,000 worth of machinery. Owing to the high grade gravel obtained from the bed of Wolf creek, the company has been unable to supply the demand, it is stated. Since last November the monthly payroll has been approximately $3000. A large increase is expected, due to additional teams and men. An additional washing plant is being installed near the one now in operation.

Kickapoo Sand and Gravel Co., west of Peru, Ind., has resumed operations after being shut down for several days because of the loss of part of its gravel washing apparatus. The broken part was recovered from the artificial lake from which the gravel is pumped. The diver was forced to make three descents into thirty feet of water in the lake before accomplishing his task. Craving an unusual thrill, Jerry Chamberlain, office manager for the company, donned the diving apparatus after the repair work was completed and made the descent into the lake. He got plenty of thrills, he said, before being hoisted to the surface fifteen minutes later.

St. Charles Sand and Material Co., St. Charles, Mo., producing sand and gravel for road and other building purposes is growing fast. Speaking about its program of extension, Richard Summa, secretary-treasurer of the company, pointed out that they will build a second plant in St. Louis county on the north side of the highway bridge, to be operated in conjunction with their establishment at the foot of Barber street, St. Charles. The new plant, which is reported to be about ready for operations, costs approximately $25,000. It includes a 24-foot switch from the Wabash track; a locomotive train and a 50-ft. boom. The loading capacity of the company's St. Charles plant is seven cars a day. The new plant employs about seven men. Mr. Summa is very optimistic regarding the future demand for sand, it is stated, especially as it relates to the various road-building programs. His company, which has just obtained a 15- and 20-cent a ton reduction in freight rates eastward, from the Wabash and Missouri-Kansas and Texas railways, is delivering sand to Troy, Warrenton, Wright City, St. Louis and other points.

Quarries

Indian Head Quarries Co., Framingham, Mass., formerly the Indian Head Trap Rock Co. (the Joel H. Stratton farm) is now the Indian Head Land Co.

Raymond Granite Co., Knowles, Calif., is installing additional equipment and will double the capacity of the plant. J. P. Graham is plant superintendent.

Cleveland Stone Co., Cleveland, Ohio, producer of building stone and grind stones, has established its executive offices in the new Union Trust building.

Ohio Quarries Co., Amherst, Ohio, has purchased 80 acres of ground in Birmingham, southwest of Amherst, and expects to open another quarry there in the near future, according to reports.

Pond Hill Crushed Stone Co., Bloomsburg, Penn., is reported as having recently installed a new $7400 crusher which the company expects will do the work that three crushers have been doing.

Builders Crushed Rock Products Co., of which Hyrum Hicks, Jr., Lane Mortgage Bldg., Los Angeles, Calif., is vice-president, has let the contract for construction of a rock crushing plant at its quarry two miles west of Azusa, Calif., on the Santa Fe.

Angels Greenstone Co., near Angels Camp, Calif., has been working steadily the last month turning out a good grade of building material. The works and surrounding vegetation are covered with dust from the pulverized rock, which makes it look quite picturesque and gives one a fair idea of what the composition looks like.

East Belt Granite Co., Sonora, Calif, recently elected the following directors: J. L. Gibbs of Tuolumne, W. E. Booker of Jamestown, A. Bocci of San Francisco, D. J. Jacobs of Sonora and John Sasek of Jamestown. Officers for the ensuing year are: J. L. Gibbs, president; W. E. Booker, vice-president; John Sasek, secretary and treasurer; A. Bocci, plant manager.

F. J. Colgan, owner of the **Colgan Limestone Products Co.**, Guarantee Title and Trust building, Columbus, Ohio, announced recently that he was making rapid progress on the new plant he is erecting at White Sulphur, five miles west of Delaware, and that it will be in operation next fall. The plant, which will have a capacity for 30,000 tons of agricultural limestone a year, will be installed with an air separating system for extracting the dust from the limestone.

Thomas & Frankenberg quarries, near Soda Point, Colo., is reported as contributing considerably to the prosperity of the people of Canon City and its surroundings. The business has grown to big proportions during the last six or eight months, giving steady employment to from 35 to 40 men. It is stated that there is dolomite enough on the property to last many years, and one of the advantages claimed is that, while adding materially to the financial prosperity of the community, none of the quarry's resources are impoverished. Most of the dolomite quarried is shipped to the Colorado Fuel and Iron Co.'s steel plant at Pueblo.

Indiana Limestone Quarrymen's Association's headquarters at Bedford, Ind., recently received Egyptian stone relics from the ancient city of Tel-El-Amarna, collected by the Egypt Exploration Society. The relics will form a part of what eventually is planned to be the most complete collection of stone types in the world. King Tut-Ankh-Amen's father-in-law, Amenhotep IV, 33 centuries ago founded the city whose ruins are now known as Tel-El-Amarna, on the Nile in Upper Egypt, and from which the collection was excavated, according to Thomas Whittemore, who obtained many of the relics for the society. Quaint pieces of limestone furniture, low-slung chairs, stools, stands, and offering table, and curious utensils for grinding meal are included in the collection, dug from many homes of these ancient ruins. There are also bits of sculpture bearing hieroglyphics sharply carved and easily translated.

Cement

Cayuga Operating Co., Portland Point, N. Y., has let the contract for construction of a cement plant.

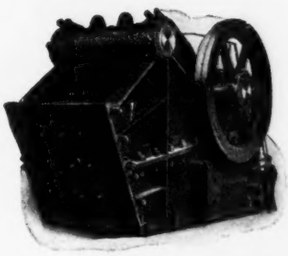
Crushing Plant Equipment

The many crushing plants which have been completely equipped by the Allis - Chalmers Manufacturing Company is evidenced by the satisfactory service which these plants are giving. The Allis-Chalmers Manufacturing Company takes the entire ***responsibility*** for the design of the plant and its equipment. These plants are built on the highest engineering standard following the best engineering practices.

Our Engineers are at your service to make complete installation drawings

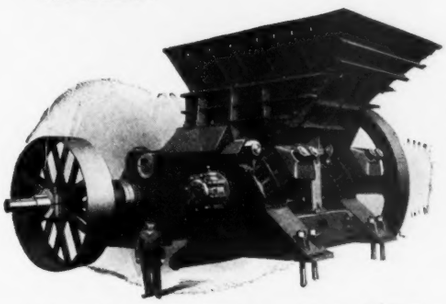
Gates No. 27 Gyratory Crusher, having two openings, each 54 in. x 141 in.

The Gates Style N Crusher, which has been developed in all sizes, is the result of 40 years' accumulated experience of the engineers and designers of the Gates Iron Works and the Allis-Chalmers Mfg. Co.



Jaw Crusher .

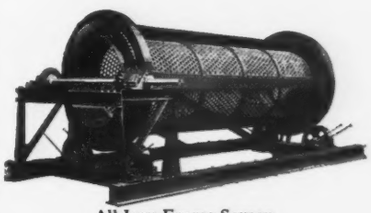
The company has also developed in all sizes Jaw Crushers for crushing copper ore, blast furnace flux and ballast stone.



60 in. x 48 in. Fairmount Type (or Single Roll) Crusher

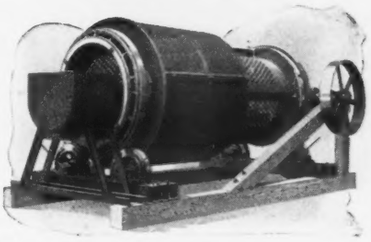
The Fairmount Crusher is intended to crush limestone, dolomite, phosphate rock, magnesite and other less tenacious rocks. It is not suitable for, nor do we recommend it for granites, trap rock or other igneous rock.

The durability, simplicity and efficiency of the Gates Patented All-Iron Frame Screens is unequalled by any other screen on the market.

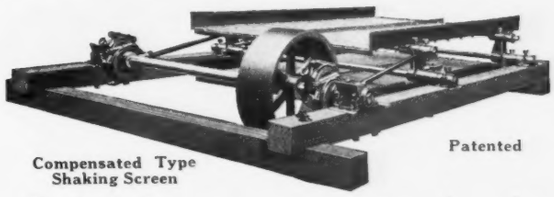


All Iron Frame Screen

Gates Screens are built in numerous sizes, ranging from 24-in. diameter by 8 ft. long, to 72 in. diameter by 24 ft. long. Open End Scalping Screens of the Cylindrical type are built in sizes ranging from 48 in. to 72 in. diameter.



Style "B" Open End Revolving Screen



Compensated Type Shaking Screen

Patented

By balancing one screen against the other, much of the vibration in the frame and building is eliminated. Up-to-date commercial limestone and gravel plants realize the vital importance of installing shaking screens, permitting the production of smaller stones to meet the market requirements.

Write for Our Bulletins

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY

MILWAUKEE, WISCONSIN, U.S.A.

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

Lehigh Portland Cement Co., Allentown, Penn., is reported to have had a loss of $10,000 when the barn of its works at Fogelsville, Penn., was struck by lightning recently and burned.

Signal Mountain Portland Cement Co., Chattanooga, Tenn., is planning the erection of a third unit at its mill, estimated to cost $500,000 with machinery.

Hermitage Portland Cement Co., 174 Third avenue, Nashville, Tenn., of which R. T. Miller is general manager, is planning to increase the output of the plant, and will probably install an additional kiln at a cost of about $300,000.

Southern States Portland Cement Co., Rockmart, Ga., of which T. J. Flournay is president, donated 100 bbl. of cement valued at $250 toward the school at Tallulah to be used for educating poor children of the mountains in north Georgia.

Standard Portland Cement Co., Moundsville, W. Va., whose incorporation notice appeared in July 26 Rock Products has an authorized capital of $150,000, and the incorporators are: D. B. Evans, S. B. Wilson, J. B. Dorsey, I. B. Wilson, and L. R. Voitle, all of Moundsville.

Lime

Berkshire Hills Co., Great Barrington, Mass., has made a number of improvements and additions at its plant, among which is a new kiln.

American Lime and Stone Co., Bellefonte, Penn., has announced the contemplated expansion of business which will naturally benefit the community in which the company operates.

Puget Sound and Oil Co., Inc., Seattle, Wash., incorporation notice of which was published in Rock Products January 12 number, has changed its name to Puget Sound Lime and Chemical Co.

Oro Grand Lime and Stone Co., Beverly Hills, Calif., is making extensive addition to its plant at 341 Foothill road, where it located about three months ago. The expenditure is reported to be about $30,000.

Batesville White Lime Co., Batesville, Ark., is making progress in the construction of its plant near Bethesda, about six miles from Batesville, and it is reported that it will be completed ready for operation some time in the fall.

Burton K. Harris lime plant, Limerock, R. I., entertained farmers of the Providence County Farm Bureau at its plant recently, where they had an opportunity to study the manufacture and uses of lime.

Carolina Lime and Phosphate Co., 199 Meeting street, Charleston, S. C., William A. Hutchinson, president, has acquired phosphate rock properties of the Charleston Mining and Manufacturing Co., on the Ashley river, and plans development, with the installation of electric power equipment, mining and conveying machinery, etc.

Bone Dry Lime Co., Cassadaga, N. Y., of which C. E. Smith is president; J. C. Dick, vice-president, and Chess Lamberton, treasurer, has petitioned the Supreme Court of Buffalo, N. Y., for a decree of dissolution, it is reported. The petition represents the concern as financially embarrassed and its property not sufficient to pay its debts.

Concrete Products

F. W. and John Royce, Seaside, Ore., have sold out their concrete products business to F. M. McSherry.

Water Seal Roofing Tile Co. will manufacture cement roofing tile in Austin, Texas. C. H. Page and others are interested.

Lufkin Concrete Brick and Tile Co., Lufkin, Texas, has purchased a site on which it will erect a factory building.

Concrete Pipe Co., Summa and Railway streets, Centralia, Wash., is about to begin erection of a $10,000 addition to its factory.

Babcock Concrete Block Co., of which H. Babcock, 1489 Holton street, Milwaukee, Wis., is president, is taking bids on erection of a 30x60-ft. one-story factory building.

Lufkin-Urbana Cement Brick Co., Lufkin, Texas, of which D. M. Fillers is manager, is to erect a brick plant on West Dozier avenue, near the H. E. & W. T. tracks.

Sarasota Cement Products Co., Sarasota, Fla., organized by R. O. Thacker and others, is erecting a plant on North Central avenue which will have a daily capacity for 2500 finished tile.

Stewart Manufacturing Co., 1441 Ocean Front, Santa Monica, Calif., is the name of a company formed by Del H. Stewart to engage in the manufacture of concrete and magnesite products.

Economy Concrete Co., Richmond, Va., has let a contract to the Richmond Structural Steel Co., 17th and Dock streets, for the erection of a new producing and mixing plant 100x100 ft. Electrically operated conveyors and other equipment will be installed.

Northwest Davenport Cement Products Co., Davenport, Iowa, has recently completed its new manufacturing plant on West Locust street, entailing an investment of about $25,000. John G. Meier is president and treasurer, and Herman Meier, secretary and manager.

Beloit Concrete Stone Co., Beloit, Wis., one of the pioneer plants for the manufacture of concrete building blocks in the middle West, was sold recently by its founder, Mrs. Ella D. Adams, to George Luety and sons, Lawrence and Elmer. The new owners will continue the business under the old name. George Luety has been manager since 1912.

Gypsum

United States Gypsum Co., Chicago, Ill., through R. S. Slattery, sales manager, donated 20,000 ft. of sheet rock wall board valued at $1000 toward the school at Tallulah for the poor children of the mountains in north Georgia.

Personals

R. L. Johnstone has taken over the St. Louis territory of the Dings Magnetic Separator Co. of Milwaukee, Wis., with offices in St. Louis.

W. B. Berry, whose picture is shown below, is the sales manager of the William L. Urschel Lime and Stone Co., Toledo, Ohio. Before Mr. Berry joined this company he was associated with the Kelley Island Lime and Transport Co., Cleveland.

W. B. Berry

P. H. Sackett, 3445 Hennepin avenue, Minneapolis, Minn., has been appointed representative of the Pawling & Harnischfeger Co., in Minnesota and in North and South Dakota. Any requests for information or any business matters concerning the Pawling & Harnischfeger line of traveling cranes, gasoline power shovels, draglines, clamshells or trenching machinery will be handled in this territory by Mr. Sackett.

H. L. Woolfenden has joined the Scott Valve Manufacturing Co., Detroit, Mich., in charge of sales promotion. He is a graduate mechanical and electrical engineer, having received both degrees from the University of Michigan. He was at one time associated with the Allis-Chalmers Manufacturing Co., and his broad experience in both sales and engineering work brings to the Scott Valve organization a valuable addition.

Phosphate Rock

Merchants' Fertilizer and Phosphate Co., Charleston, S. C., is reported to be planning to rebuild the portion of its local plant recently destroyed by fire with loss estimated at $130,000, including equipment.

Magnesite

Magnesite Products Co., Chicago, Ill., has leased from the J. A. Rhodes Co., the one and four-story building at 2810 S. Albany for five years at a term rental of $16,500 for the manufacture of stucco.

Manufacturers

Williamsport Wire Rope Co., Williamsport, Penn., announces a further expansion of its warehouse facilities by the addition of a large stock at Cromwell, Okla., to accommodate the oil trade in that territory. This is another of the many distributing warehouses in the oil fields under the management of H. R. Gruber, with offices at Tulsa, Okla.

Marion Steam Shovel Co., Marion, Ohio, "Marion Excavator," the house organ of the Marion company, announces in its August number the 40th anniversary of the company, which was incorporated August 9, 1884. In this number is given the history of the company from its beginning up to the present day. A picture of the Huber Manufacturing Co. in 1884, where the first two Marion shovels were built, is shown.

Pawling & Harnischfeger Co., Milwaukee, Wis., who is now celebrating its 40th year of progress in the manufacture and sale of crane and excavating machinery, has recently added a large steel foundry to its plant. This foundry was formerly operated by the Hercules Steel Casting Co. for commercial production, but is now entirely devoted to the steel castings required for the production of Pawling & Harnischfeger machines. In the production of overhead traveling cranes, hoists, gasoline powered shovels, draglines, skimmer scoops, trencher and other equipment the company states that it now has full control of the process from "Pig Iron to Finished Machine."

Trade Literature

J. S. Schofiled's Sons Co., Macon, Ga. Circular in looseleaf form nicely bound illustrating the boilers made by this company and accompanied by tables of specifications. The circular also illustrates center-crank and side-crank engines and the Schofield patented rotary dryer.

Walter A. Zelnicker Supply Co., St. Louis, Mo., Bulletin 326, listing rails, cars, steel piling, machine tools, machinery for power plants and contractors, pipe and tanks, and other equipment which this company supplies to manufacturers, railroads, and those who buy or sell rails etc.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Booklet illustrating and describing the centrifugal pumps manufactured by this company. Efficiency curves are shown, and there are a number of friction tables, head capacity tables, and Weir tables and instructions pertaining to the selection and operation of centrifugal pumps.

Ruston & Hornsby Ltd., Lincoln, England, are distributing a circular entitled "Widening a River," which deals with the widening of the river Nene between Peterboro and Wisbech, the work being done by a Ruston & Hornsby No. 10 dragline excavator. The circular illustrates the wide range of work for which these excavators are available. Copies may be had from the company on request.

Union Iron Works, Erie, Penn., has recently issued an interesting booklet, describing in detail the design and construction of its new universal boiler of the self-contained return flue type. The booklet shows interior and exterior views as well as sections through the boiler and a table gives data on all dimensions of importance. The universal boiler is made in sizes from 25 to 150 hp. and is particularly adapted to installations where only small floor space is available. Copies may be had by addressing the company.

Smokeless Oil Burner Co., Bucyrus, Ohio. Catalog in looseleaf form nicely bound, illustrating and describing the various oil burners manufactured by this company, listing a few of the many uses to which smokeless oil burners have been applied. There is a section devoted to oil burning in the clay industry which shows numerous illustrations of kiln burners, oil strainers and meters, steam and electric pumps. A table of relative values of fuels is included, besides several other tables relative to oil burners.

Schaffer Poidometer Co., 2828 Smallman street, Pittsburgh, Penn., has just issued its new catalog describing the Schaffer Poidometer, a machine for automatically feeding, weighing and conveying crushed, granular and pulverized materials, equipped with an attachment for measuring liquids. There is a cyclopaedic drawing of both the Poidometer and the Liquidometer, with the parts numbered and named for ready reference in ordering repair parts.

Harbison-Walker Refractories Co., Pittsburgh, Penn., has recently issued its latest publication entitled "Thermolith," which is a beautifully illustrated and printed handbook on this company's all-temperature fire cement, comprising a treatise on the value and application of Thermolith in the various industries in which it is used, together with its proofs and tests, and including scientific data relative to its performance. Much thought and care have been given to the preparation of this book.